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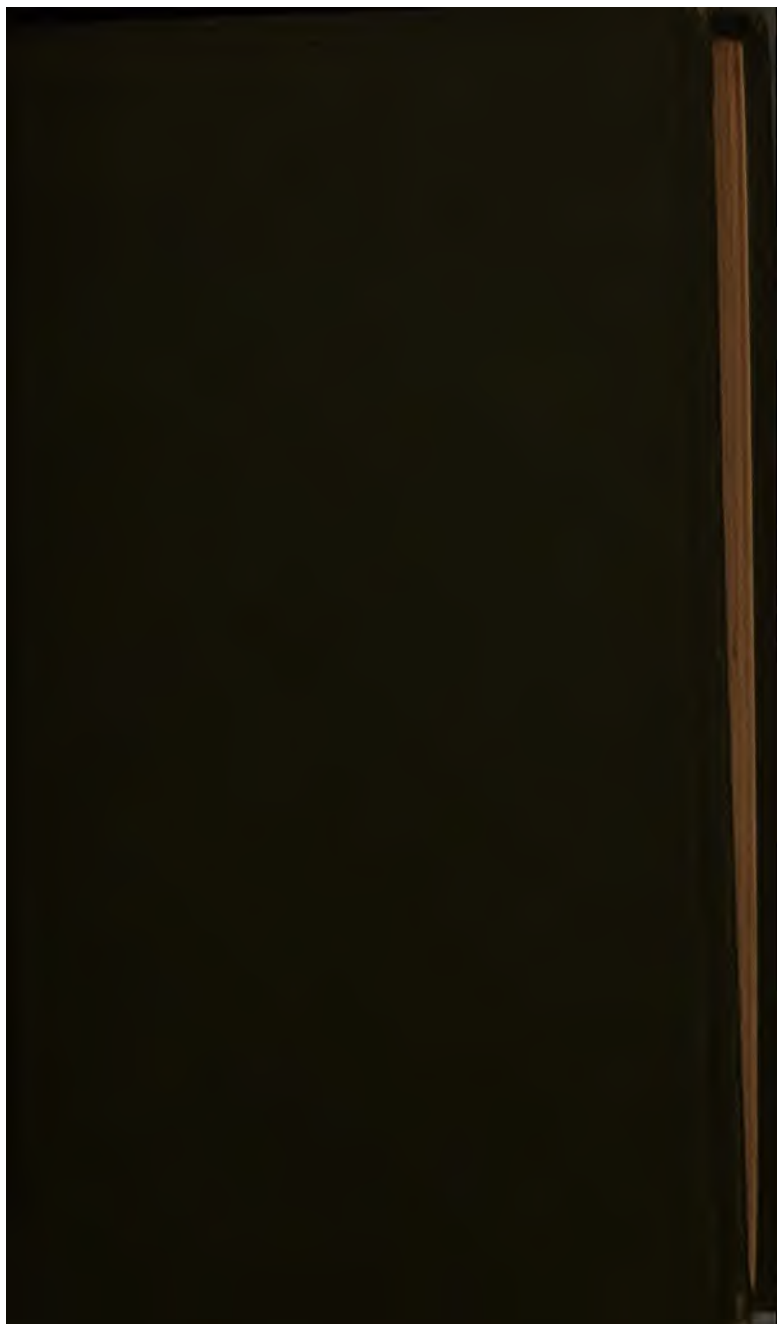
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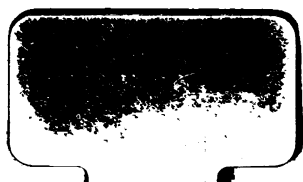
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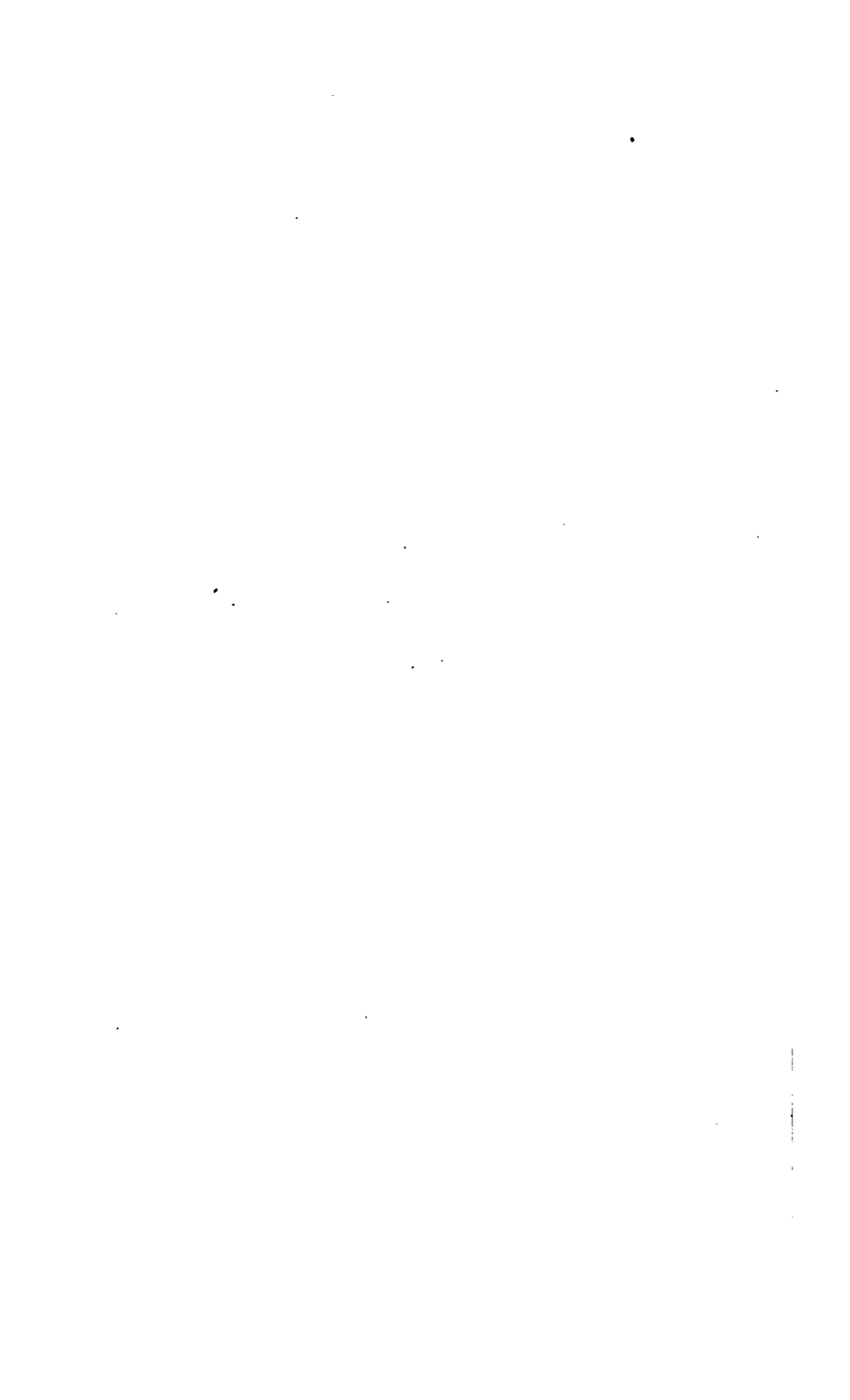


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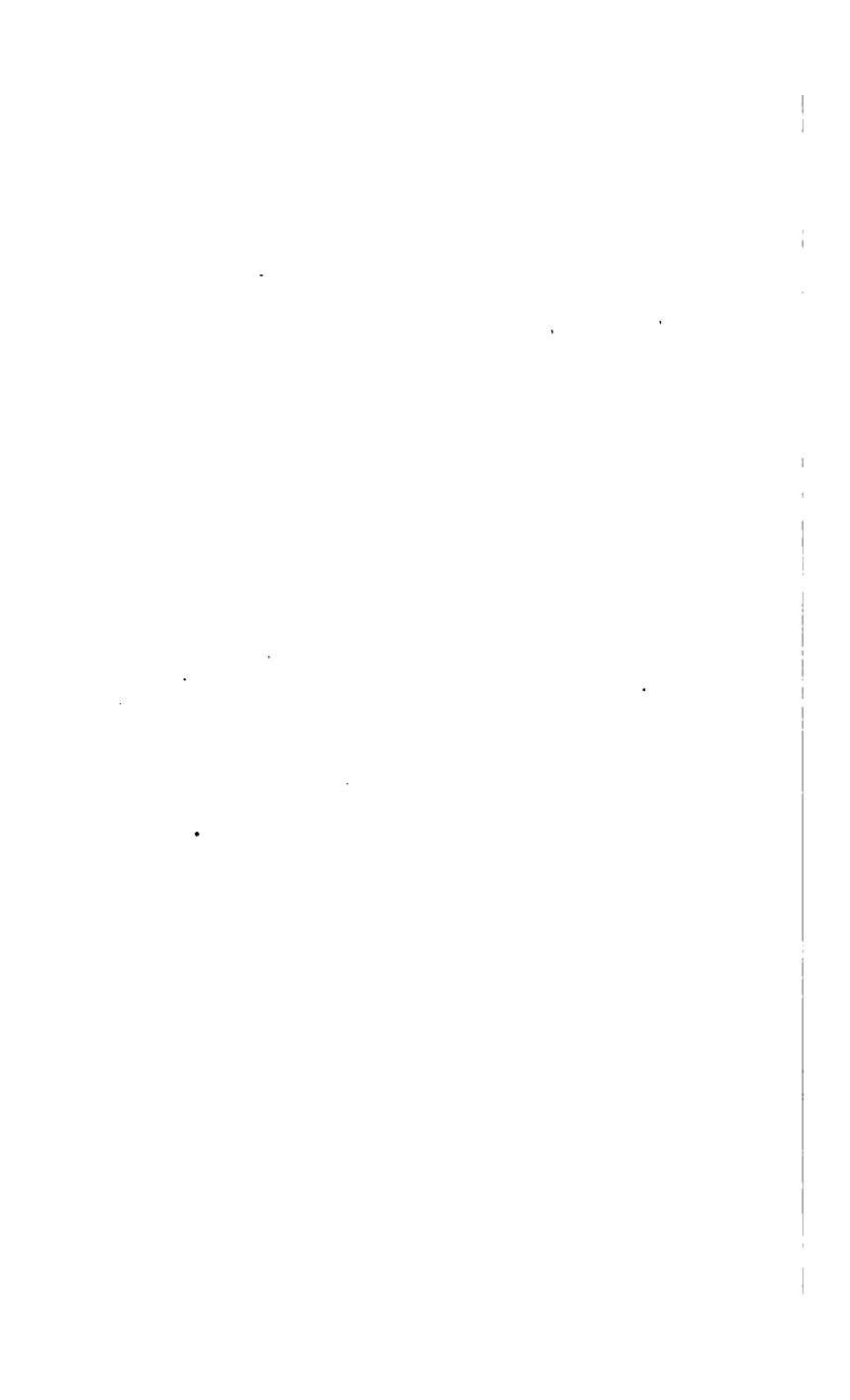
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NOTES ON MATERIA MEDICA AND PHARMACY.

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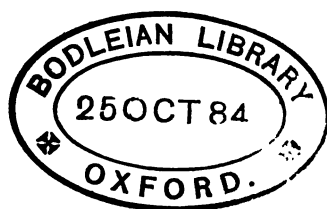
NOTES
ON
MATERIA MEDICA
AND
PHARMACY

BY
FREDERICK T. ROBERTS,
M.D., B.Sc., F.R.C.P.

EXAMINER IN MATERIA MEDICA AND PHARMACY IN THE UNIVERSITY OF
LONDON, AND IN MATERIA MEDICA AT THE ROYAL COLLEGE OF
PHYSICIANS; PROFESSOR OF THERAPEUTICS AT UNIVERSITY
COLLEGE; PHYSICIAN TO UNIVERSITY COLLEGE
HOSPITAL, AND TO THE BROMPTON
CONSUMPTION HOSPITAL, ETC.

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DEDICATED
TO THE
MEDICAL STUDENTS
OF
UNIVERSITY COLLEGE, LONDON.

PREFACE.

THE duration of the Course of Lectures on *Materia Medica*, as required by the Examining Boards, is far too short to do justice to the whole range of subjects included under this term ; while it has always appeared to me a waste of time to lecture on certain branches, which can only be satisfactorily taught by practical demonstration. These are the primary reasons which have induced me to publish the following "Notes." They are mainly founded upon lectures which I have delivered from time to time, as part of the Course at University College, and their publication will enable me in future to devote the entire course to Therapeutics. Although intended in the first instance for the Students of University College, I trust that these notes may be found useful to others, either as an aid in learning the main facts

relating to Materia Medica and Pharmacy, or for reference.

I have to express my acknowledgments to my friend and pupil, Mr. Raymond Johnson, for the valuable assistance which he has rendered me in revising the final proof-sheets, and in preparing the Index.

THE AUTHOR.

53 Harley Street, W.

September, 1884.

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MATERIA MEDICA AND PHARMACY.

SECTION I.

INTRODUCTION.

THE study of the medicinal agents which are employed in the treatment of disease constitutes an essential part of a medical education. The subject, as a whole, may be conveniently designated by the term PHARMACOLOGY, but it naturally arranges itself under three divisions, namely:— I. MATERIA MEDICA. II. PHARMACY. III. PHYSIOLOGICAL ACTION AND THERAPEUTICS.

MATERIA MEDICA has come by general usage to be associated with that branch of the subject which deals with medicinal substances in themselves; that is, with the particulars which have to be learnt about each individual drug. PHARMACY is concerned with the actual preparation of the medicinal agents themselves, and of their various combinations and compounds. PHYSIOLOGICAL ACTION AND THERAPEUTICS, in their more restricted meaning, refer to the action of drugs upon the system in health and disease, and their practical uses in treatment.

The following "Notes" are intended merely for beginners; and on this account they deal mainly with Materia Medica and Pharmacy. With regard to Therapeutics, it is useless to attempt to teach this branch of the subject to those who have not as yet acquired the preliminary knowledge,

without which its intelligent study is absolutely impossible. Therefore, all that will be done is to point out the action of drugs, as indicated by the ordinarily recognised terms—*emetic, purgative, tonic, diuretic, &c.*; and to mention the doses of the preparations used for internal administration.

I. METHOD OF STUDY.

It is preferable to recognise MATERIA MEDICA and PHARMACY as distinct branches, and to study them separately. Obviously MATERIA MEDICA should come first. The student should avoid burdening his memory with minute and unimportant details about the various drugs, but endeavour to grasp the essential facts relating to each, and to recognise intelligently their practical bearings. The requisite information must of course be obtained from books, lectures, or demonstrations, but these methods of instruction should always be supplemented by personal and practical study of the drugs themselves. Thus, in reading the description of a drug, the different points will be far more easily understood and remembered if the student has a specimen before him, and carefully observes the characters which are described. Moreover, by examining and handling the specimens again and again, he will make himself perfectly familiar with these characters; and may also learn to contrast those drugs which are liable to be mistaken for each other. Again, he should endeavour to practise and verify chemical tests, where these are important, so as to have them impressed on the memory. Nor should the study of Medical Botany be forgotten, in so far as this subject is connected with Materia Medica; while useful information may be gained

by observing the plants themselves in their natural state, where this is practicable.

PHARMACY is essentially practical, and a satisfactory and abiding knowledge of its details can only be acquired by learning the "art of dispensing." Formerly this branch was taught during apprenticeship, but now it has to be studied as a separate part of the medical curriculum, either in a private or public dispensary. It must be insisted upon that *practical pharmacy is important*, and should receive adequate attention. While during the period of long apprenticeships it occupied far too prominent a position, the danger now is lest students should pass into the opposite extreme, and go through the instruction demanded by the examining boards in a perfunctory manner, as if it were of no consequence. Of course a practical knowledge of pharmacy is absolutely essential for those who intend to engage in a dispensing practice; and it is very useful to those who have no such intention. Thus it teaches them, and makes them familiar with:—(1) The *art of prescribing*, i.e. how to write prescriptions, and the best combinations of different drugs to employ. (2) The *modes of administering* and using therapeutic agents. (3) The proper *doses* of drugs under various circumstances. (4) *Incompatibles*. Medicines may be either *chemically* or *physiologically* incompatible, and it is of considerable importance to become acquainted with, and to remember the chief facts relating to this subject. Owing to their incompatibility drugs when combined together may give rise to compounds which are either inert or injurious; or which are merely objectionable on account of their appearance, colour, taste, or other characters. It must be borne in mind, however, that agents which are chemically incompatible may have valuable therapeutic properties; as may be exemplified

by Lotio Nigra, Mistura Ferri Composita, and numerous other combinations.

While Pharmacy is essentially practical, its study may be guided and assisted by books. *The book* which must be regarded as the standard of Pharmacy in this country, is the British Pharmacopœia; but other countries have their several Pharmacopœias, which may be studied with advantage; while most hospitals have now their special Pharmacopœias, from which much valuable information may be gained; and there are several useful books of prescriptions compiled by individual writers. In studying the British Pharmacopœia with reference to Pharmacy, attention must be paid to the following points:—1. The *weights* and *measures* which are employed, with their signs and abbreviations. 2. The mode of conducting *general pharmaceutical operations*. 3. The nature of *groups of preparations*, and their general methods of manufacture. 4. The details of the preparation of *individual drugs* and of *active principles*. 5. The *pharmaceutical compounds* or *officinal preparations* of each particular drug, with their important ingredients, and in some instances the proportions of these ingredients. 6. The *members of each group* of officinal preparations; with such details as may be of importance in relation to any individual member of the group.

2. GENERAL NATURE AND SOURCES OF DRUGS.

The agents which are used as medicines must be regarded in the first instance under the two divisions of:—1. *Officinal* or *official*; 2. *Non-officinal* or *non-official*. *Officinal* or *official* drugs are those which are recognised by the BRITISH PHARMACOPŒIA, and this division alone will be dealt with in these

notes; although many *non-official* agents have now obtained an established reputation in treatment, and are of considerable practical value.

The following table will serve as a basis for indicating generally the sources and nature of medicinal agents.

A. INORGANIC KINGDOM	{	1. Non-metallic.
		2. Metallic.
		3. Special chemical products.
B. ORGANIC KINGDOM	{	4. Vegetable or Botanical.
		5. Animal.

1. Some important drugs belong to the **non-metallic** division of chemistry, such as certain gases, carbon, sulphur, iodine, phosphorus, and some acids.

2. The **metallic** division yields a large number of valuable substances, preparations of several of the metals being extensively employed in treatment. They are sometimes used as found in nature, especially in the form of *mineral waters*. Some salts are also obtained ready formed, and have only to be purified for use. As a rule, however, metallic preparations have to be specially made, in the form of oxides, salts, acids, and various other combinations. Very rarely is a metal itself employed therapeutically.

3. Under **special chemical products** I include certain compounds which belong to the domain of *organic chemistry*, and which are made up of some of the non-metallic elements in various combinations. Alcohol, the different ethers, and hydrocyanic acid, will serve to illustrate this group.

4. From the **vegetable or botanical** kingdom a very large number of drugs are obtained, many of them of the greatest value and importance. In a few instances the *entire plant* is made use of; but commonly one or more of its *parts* are alone offici-

nal, such as the root, bark, wood, leaves, flowers, fruit; or seeds. Two drugs derived from the vegetable kingdom are really portions of plants in a *diseased* condition, namely, ergot of rye and gall-nuts. Plants are seldom administered in their natural state, but are usually made into different *pharmaceutical preparations*. Again several important drugs consist of *products* obtained from certain parts of plants, by incision or in other ways, of which opium, aloes, scammony, assafoetida, camphor, catechu, and kino afford prominent examples. These are often given in their *simple* state, but in reality they are *compound* agents, and contain *active principles* and other constituents, sometimes in considerable number, and having very different actions, which can be separated from each other, and are frequently used for their individual effects. Some of these active principles have been prepared artificially, in the chemical laboratory; while others can be so modified by chemical processes, as to yield products essentially different in their action upon the system, although their chemical composition may be but very slightly altered.

The **active principles** derived from the vegetable kingdom present much variety, and they belong to the following groups:—

a. *Alkaloids*, which are as a rule most valuable agents, and often extremely powerful, *e.g.* morphia, quinia, strychnia, atropia.

b. *Neutral principles*. These are usually bitter, and some are very useful in treatment, but others are almost inert; *e.g.* meconine, calumbine, elaterine, digitaline.

c. *Organic acids*, *e.g.* citric, tartaric, malic, oxalic, tannic and gallic (which are very extensively found in the vegetable kingdom), meconic, valerianic.

d. Oils, including (i) *Fixed oils*, such as linseed, olive, castor, and croton oils; and (ii) *Volatile or essential oils*, e.g. oils of rue, lavender, peppermint, and mustard.

e. Gums. These are of two kinds, namely, (i) *Arabine*, which is soluble in water; (ii) *Tragacanthine* or *Bassorine*, which swells up in cold water.

f. Resins and their varieties. These include, (i) *Simple resins*, e.g. guaiacum, mastiche. (ii) *Gum-resins*, e.g. myrrh, assafoetida, ammoniacum, scammony. (iii) *Oleo-resins* or *Terebinthines*, e.g. copaiba, turpentine, canada balsam. (iv) *Balsams*, consisting of resin and benzoic or cinnamic acid, e.g. benzoin, balsam of Peru, and balsam of Tolu.

g. Starch and Saccharine elements.

h. Vegetable jelly, pectin, and pectic acid.

i. Protein or Albuminoid substances, including *vegetable albumin, fibrin, casein, and gelatine*.

j. Extractive matters. These are principles the nature of which is not definitely known, and which are provisionally grouped together under this term. Their number is becoming progressively less, as researches reveal more clearly what the active principles of plants really are.

k. Inorganic salts. Most plants contain inorganic constituents, and these may be of more or less importance, especially salts of the alkalies and lime. Rhubarb contains a considerable quantity of oxalate of lime.

It will be readily understood that the different groups of active principles just indicated are very variously combined in different plants or parts of plants which are employed medicinally. Moreover, they differ greatly in their power and effects upon the system, and in their therapeutic value. It may also be mentioned here that some plants contain elements having no obvious physiological action of importance, but when these elements are

brought into contact with water, a chemical decomposition takes place, which results in the production of very powerful agents. This is illustrated by oil of bitter almonds, and oil of mustard.

5. From the **animal kingdom** only a comparatively few therapeutic agents are obtained, and they may be arranged as follows:—

a. Animals themselves, e.g. cantharides, cochineal, leeches.

b. Parts of animals, altered or prepared in some way, e.g. isinglass, lard, suet, cetaceum.

c. Secretions, either alone or with the glands which form them, e.g. musk, honey, castor.

d. Special preparations obtained from organs or secretions, e.g. cod-liver oil, pepsin, ox-gall, milk-sugar, wax.

e. Eggs. The white and yolk of hens' eggs are used medicinally.

3. GENERAL SCOPE OF MATERIA MEDICA.

It will perhaps help to make the subject more clear, to point out definitely what MATERIA MEDICA actually includes; or, in other words, what it may be necessary to learn about any individual drug? Of course there are great differences in this respect as regards different drugs, some being quite unimportant, and all that is required is that the student should know what they are, and should be able to recognise them when he sees them; while in other instances more or less numerous details have to be acquired, which are of real consequence. The facts which it may be requisite to learn about a drug may be thus summarized:—

a. Its officinal source, i.e. whence it is derived. In the case of drugs obtained from the vegetable kingdom, their *botanical* and *geographical* source must be separately distinguished.

b. Its nature, or what class of substances it belongs to. In relation to the vegetable drugs, it is requisite to learn what part or parts of a plant are officinal, as well as the nature of any special drug obtained from this kingdom.

c. Its mode of preparation. This includes not only the more or less complicated chemical processes by which salts and numerous other medicinal substances are made; but also the methods by which certain drugs are procured in their natural state, or the treatment to which they are subjected afterwards, in order to render them fit for use.

d. Its active principles or chemical composition. The great majority of drugs are more or less complex, and their more important constituents ought to be known. Thus the active principles which the officinal part or parts of a plant contain, and to which they owe their therapeutic efficacy, should be learnt; as well as those of vegetable and animal products. Moreover, it is requisite to be acquainted with the chemical composition or *formula* of the various metallic and other salts or compounds; and with the elementary constitution of the more important organic preparations and principles, such as ether, tannin, morphia, &c.

e. Its chief characters and properties. These include, in the first place, the more obvious characters by which a drug is recognised, and by which it is at once distinguished from all others; and, secondly, the more minute physical and chemical properties which many drugs present, and which have to be ascertained by more or less elaborate investigation. These may explain their therapeutic usefulness; but from a *Materia Medica* point of view, they are important, inasmuch as they enable substances to be distinguished from each other which cannot be otherwise separated. It may be mentioned here that some medicines present impor-

tant *varieties*, with the distinctive characters of which it is necessary to be acquainted, *e.g.* cinchona, senna, aloes.

f. Its *tests, impurities, and adulterations.* The tests of a drug are scarcely separable from its other properties, so far as its mere recognition is concerned; but they are also applied in the B.P. to determine its strength and purity. Unfortunately even medicines are liable to be impure or adulterated, either from accident or design, and it is essential to know what impurities or adulterations must be looked for in connection with any particular drug, and how they are to be severally recognised and detected. In some cases their detection is quite easy; but in others elaborate investigation is required, which it is quite beyond the power of the student to carry out.

4. PHARMACY.

A. THE PHARMACOPŒIAL PREPARATIONS.

Having already indicated what the study of Pharmacy includes, it will now be convenient to give an outline of the groups of preparations recognised by the British Pharmacopœia, sufficient to enable the student to understand their general nature; and to have some idea as to how they are made. The official preparations of particular drugs will be considered under their respective headings; and the members of the different groups will also be subsequently enumerated. The preparations are here taken in alphabetical order.

I. ACETA—VINEGARS. Solutions of the active principles of certain drugs in either strong or dilute *acetic acid*, with or without the aid of heat.

II. AQUÆ—WATERS. Preparations thus named are of three kinds, namely:—

1. *Aqua Destillata*, or water distilled from its ordinary impurities.

2. *Solutions* of certain substances in distilled water.

3. Preparations made by *distilling* water with parts of plants containing *volatile oil*, or with the volatile oil itself, by which process some of the oil passes over in solution.

III. CATAPLASMATA—POULTICES. Soft and moist preparations, for external and local application. They consist of:—1. The *liquor*, which, with one exception, is boiling water; 2. The *corpus* or *basis*, usually linseed-meal, exceptionally bread or flour; 3. The *accessorium* in most instances, which is an additional medicinal agent, intended to produce particular therapeutic effects. The ingredients are mixed in different ways.

IV. CHARTÆ—PAPERS. Special preparations on paper for external use. There are only two in the Pharmacopœia, and each is prepared in a particular way.

V. CONFECTIONES—CONFECTIONS. Soft, but more or less consistent substances, intended for internal administration, or for forming the basis of pills. They consist of drugs incorporated with *saccharine* substances, these being used either for their preservation, or for rendering them more palatable. Confections are prepared in a variety of ways; and the saccharine material is either *sugar*, *syrup*, or *honey*.

VI. DECOCTA—DECOCTIONS. Solutions of the active principles of vegetable drugs, obtained by *boiling the drug in water* contained in a covered vessel. The principles to be dissolved must be non-volatile. There are exceptions in details in making decoctions, but as a rule the substances are directed to be boiled for 10 *minutes*; to be *strained while hot*; and as much distilled water to be poured

over the contents of the strainer, as will bring the whole up to *one pint*. With two exceptions, all the officinal decoctions are *simple*.

VII. EMPLASTRA—PLASTERS. Preparations intended for external application. They are variously made, but consist essentially of combinations of substances spread out on some firm material, such as calico or leather, and which are adhesive at the temperature of the body. These substances are mainly *oleo-margarate of lead*, *resin*, *wax*, or *oleaginous* compounds; and with these are mixed, in several instances, *medicinal* agents of a more or less powerful nature.

VIII. ENEMATA—INJECTIONS OR CLYSTERS. Liquid preparations intended to be injected into the rectum. Their basis is generally *mucilage of starch*.

IX. ESSENTIÆ—ESSENCES. Solutions of a *volatile oil* (1 part) in *rectified spirit* (4 parts).

X. EXTRACTA—EXTRACTS. In general terms an extract may be defined as a concentrated preparation containing the active principles of a vegetable drug, obtained by evaporating the juice of plants, or solutions of their principles in different menstrua, and in some cases submitting the products to certain processes in order to preserve them. Extracts are of various degrees of consistence, and have on this ground been divided into *fluid*, *semi-solid*, and *hard* or *dry*. The more practical arrangement of these preparations, however, is as follows:—

A. **Fresh or green extracts.** This class of extracts are usually prepared thus:—1. *Press the juice* out of certain fresh parts of plants, differing in different cases. 2. Heat this juice to 130° to *coagulate the green colouring matter*; separate by filtration; heat the fluid to 200°, to *coagulate the albumen*, which is also separated by filtration. 3. Evaporate the remaining liquid, at a temperature

not above 140° , to a thin syrupy consistence; add the green colouring matter previously separated; and evaporate to the required consistence.

A few green extracts are prepared by heating the juice at once to 212° , to coagulate the albumen; separating this by filtration; and evaporating the fluid to the required consistence.

B. Aqueous extracts. These are prepared by acting upon either a part of a plant, or a vegetable product, by *distilled water*; and evaporating the fluid to a suitable consistence. The process of abstraction is carried out in different ways in different cases, namely, by:—

1. Digestion in boiling water.
2. Infusion in boiling water, and subsequent boiling.
3. Decoction or boiling.
4. Digestion in cold water.

C. Alcoholic extracts. In this class of extracts the active principles of the drug are dissolved out either by *rectified spirit* alone; *rectified spirit* and *water* used separately; or *proof spirit*. The details of the process differ considerably in the case of individual extracts. The solutions are then evaporated to a proper consistence.

D. Ethereal extracts. *Ether* is used for the purpose of *dissolving out oil* from the drugs, before preparing two extracts belonging to other groups; but in two instances it is employed as the *solvent*, either alone or after the action of rectified spirit.

E. Liquid extracts. These are characterised as follows:—

1. They are of a *fluid* consistence.
2. The active principles are abstracted, in all cases but one, by *water*, usually cold; in one case *ether* is used.
3. After evaporation to a proper consistence, *rec-*

tified spirit is added to prevent decomposition, except in the case of the ethereal extract.

XI. GLYCERINA—GLYCERINES. Solutions of drugs in *glycerine*, in some cases the solution being aided by heat.

XII. INFUSA—INFUSIONS. The chief facts relating to these preparations may be thus summarised:—

1. They are made by *infusing* or *digesting* drugs in distilled water, in a covered vessel.

2. The substances employed are, as a rule, either *bruised*, *sliced*, *cut small*, or *powdered* before being infused. The quantities are variable.

3. *Boiling water* is used, with four exceptions; in two instances cold water is employed, and in the other two water at 120°. The quantity ordered is 10 ounces.

4. The *time* for infusion varies according to the solubility of the active principles of the drug. In most cases it is *one hour*.

5. In every instance except one, the infusion is directed to be *strained* before use.

6. With few exceptions the infusions are quite *simple*.

XIII. INJECTIO—INJECTION. This term is used somewhat indefinitely, but in the B.P. it is confined to the class of *concentrated solutions* of powerful drugs, employed for *hypodermic injection*, of which at present there is but one officinal member—*Injectio Morphicæ Hypodermica*.

XIV. LINIMENTA—LINIMENTS OR EMBROCATIONS. These preparations are characterized as follows:—

1. They are intended for *external* use, being applied to the skin, usually with the aid of friction.

2. Most of them are of more or less *oily consistence*, and they have been designated “very thin ointments.” They all contain either a *fixed oil*, a *volatile oil*, a *concrete oil* (camphor), or a *soap*; and several of them have two or more of these in

combination ; some liniments also contain *rectified spirit*.

3. Some liniments are quite *simple*, others are *compound*; and the simpler liniments form the basis of some of the more complex, active ingredients being added, intended to produce special effects.

4. The exact *mode of preparation* varies, but in many instances it is a mere mixing together of the ingredients.

XV. LIQUORES—SOLUTIONS. It is difficult to give any general account of these preparations, as they are very numerous (39), and present considerable variety. They must, therefore, be studied mainly individually or in groups. They are, with few exceptions, *solutions* of drugs, solid, liquid, or gaseous, in water; or *dilutions* with water. In some instances *acids* (acetic, hydrochloric, nitric) or other ingredients are employed to aid the solution; in one case *ether* is used, in another *chloroform*. In one group *rectified spirit* is added to prevent decomposition. The different solutions are prepared in various ways, the process of dissolving being often aided by heat, pressure, &c.

XVI. LOTIONES—LOTIONS. These are external applications of a liquid character, and such preparations, of a non-official kind, are often employed. In the B.P., however, there are but two recognised—*Lotio Nigra* and *Lotio Flava*, which are respectively precipitates of *mercurous* and *mercuric oxide* with *lime-water*.

XVII. MELLITA—HONEY. Preparations including *Mel Depuratum*—*purified* or *clarified honey*; and *Mel Boracis*, in which borax is mixed with the preceding. Honey is also an ingredient in the *Oxymels*.

XVIII. MISTURÆ—MIXTURES. This is another group of preparations of which no very definite general description can be given, and each of its

official members must be separately studied. The following are the chief general points:—

1. Mixtures are for *internal* administration.
2. Some are *simple*, but several are of *complex* composition.
3. They consist mainly of substances *suspended* in water, cinnamon-water, rose-water, or milk; partly *dissolved*, and agents are sometimes used to aid solution. Some mixtures are merely *solutions*.
4. The agents used to suspend the drugs are *sugar, syrup, yolk of egg, or gum*. When the drugs suspended are oils or resins, an *Emulsion* is formed.

5. In some instances ingredients for *flavouring* are added to mixtures.

XIX. MUCILAGINES—MUCILAGES. Solutions of *gummy substances* in water; or *starch boiled* so that it is in a “state of excessive hydration.” The mucilages are of more or less thick consistence.

XX. OLEA—OILS. These preparations will be more conveniently discussed hereafter. In the meantime it will suffice to state that the official oils may be arranged under the following groups, as regards their mode of preparation:—

1. Oils obtained by *distillation*.
2. Oils obtained by *expression*, sometimes aided by *heat*.
3. Oil extracted by *heat* alone (cod-liver oil).
4. *Solution* of a drug in oil (phosphorated oil).

XXI. OXYMELLITA—OXYMELS. A mixture of *clarified honey* with *acetic acid* (*Oxymel*); or with *aceium scillæ* (*Oxymel scillæ*).

XXII. PILULÆ—PILLS. In this class of preparation a more or less consistent mass or *bolus* is first made, and this is divided into *pills* of suitable size, or according to the dose required. The official pills are numerous (23), and it is important to know their chief ingredients, and in some instances to remember their proportions.

The following general facts may be noted and remembered:—

1. Pills are for *internal* administration.

2. Most of them are of *complex* constitution, and many contain several active drugs. Some ingredients, however, are merely intended to subdivide conveniently the dose of the active drugs, or to give the bolus a suitable consistence.

3. In their *preparation* the rule is to powder the solid ingredients, and then to thoroughly mix them and the other ingredients with some material, so as to form a uniform consistent mass. The materials used for this purpose are chiefly *treacle*, *hard soap*, and *confection of roses*; exceptionally *syrup*, *confection of hips*, *water*, or *castor oil*. Some pills are made in a special manner, and these have to be separately studied.

XXIII. PULVERES—POWDERS. These scarcely need any definition, and only call for brief notice.

1. They are all more or less *complex*, their ingredients being in most instances all active drugs; but in some cases certain constituents are only used to promote the minute division and intermixture of the more active medicines.

2. They consist of *finely-powdered solids*, the general directions as to their preparation given in the B.P. being “to mix the ingredients thoroughly; pass the powder through a light sieve, rub lightly in a mortar, and preserve in a stoppered bottle.”

XXIV. SPIRITUS—SPIRITS. The preparations thus named may be divided into three groups, namely:—

1. The *alcoholic* group.

2. *Solutions* in, or *mixtures* of various agents with *rectified spirit*, such as camphor, volatile oils, ether, chloroform, etc.

3. *Special preparations*, of a more or less complex nature, each made in a peculiar way.

XXV. SUCCI—JUICES. There are two groups of juices officinal, namely :—

1. The *fresh expressed juices* of certain ripe fruits.

2. *Juices specially prepared*, by pressing them out of fresh bruised plants; adding one measure of *rectified spirit* to every three measures of juice, to preserve it; setting aside for seven days; filtering; and keeping in a cool place.

XXVI. SUPPOSITORIA—SUPPOSITORIES. The following points may be noted with reference to this class of preparations :—

1. They are of somewhat *solid* consistence, but capable of melting at a moderate heat, or of being dissolved; and are made into *small moulds*, of a conical or other suitable shape, for introduction into the rectum.

2. Each suppository contains one or more important *active ingredients*, of which the proportions must be learnt.

3. They are prepared in two ways, namely :—

a. Melt *white wax* and *oil of theobroma* by means of a gentle heat; mix the active ingredients with *benzoated lard* in a mortar; add to the melted portion, and thoroughly mix; pour, when fluid, into suitable moulds, of 15 *grains* capacity.

b. Mix the active ingredients with *glycerine of starch* and *curd soap* in certain proportions; add *starch* to form a paste of suitable consistence; divide into 12 suppositories.

XXVII. SYRUP—SYRUPS. These are liquid preparations for internal administration, useful on account of their sweet and pleasant taste, due to their saturation with sugar, which also serves usually for their preservation. They may be classified according to the following groups :—

1. *Simple syrup*, which is a solution of refined sugar in water in certain proportions.

2. Syrups made by *mixing simple syrup* with cer-

tain *tinctures*; or by *dissolving* a drug in a mixture of *syrup* and *water*.

3. Syrups made from refined sugar and various drugs by *special processes*, sometimes very complicated. In this group either cold distilled water, boiling water, rectified spirit, or rectified spirit and water are generally used as solvents. There are two exceptions, in one case the sugar being merely dissolved in *acetum scillæ* (*Syrupus scillæ*); in the other in *lemon-juice* (*Syrupus limonis*), but here *lemon-peel* is also used.

Syrups should be kept in *full bottles*, else the sugar is liable to crystallize. If they contain too little sugar, they are apt to ferment. Their preservation is aided in some instances by certain special precautions.

XXVIII. TINCTURÆ—TINCTURES. This is a very numerous class of preparations (68), and they present considerable variations. The following are the general points to be noted:—

1. Tinctures are *solutions* of drugs or active principles in *menstrua* of a *spirituous* nature, either because these substances are not soluble in water, or because such solutions are unstable, and decompose more or less readily.

2. They are either *simple* or *compound*, the latter containing several ingredients usually. Some constituents are used merely for their taste, for suspending other drugs, or for other special purposes.

3. The solvents employed in different instances are:—

a. Rectified spirit, chiefly when drugs contain much *resin* or *volatile oil*.

b. Proof spirit, when the principles are partly soluble in water, partly in spirit. This is the *menstruum* most frequently used.

c. In exceptional cases aromatic spirit of ammonia; strong solution of ammonia, (with rectified or proof

spirit); *spirit of ether*; *tincture of orange peel*; and *tincture of cardamoms* with rectified spirit.

4. Solid drugs made into tinctures are usually directed to be *cut small, bruised, or coarsely powdered*, etc., before being acted upon by the menstruum. In one instance (*nux vomica*) the drug is directed to be *steamed* until it is well softened, then rapidly dried, and reduced to fine powder.

5. The methods employed in preparing tinctures are as follows:—

a. *Simple mixture or solution.*

b. *Maceration* for seven days, with occasional agitation, in a closed vessel; then filtering, and in many cases pressing and straining; and finally adding sufficient spirit to make *one pint*.

c. *Percolation* alone in one instance.

d. *Maceration and percolation.*

e. *Special processes.*

XXIX. TROCHISCI—LOZENGES. The points to be noted about these preparations are as follows:—

1. They are *small solid tablets* intended to be sucked, and are a convenient form of administering drugs in small doses, or such as have not a disagreeable taste.

2. Most of them are *simple*, a few *compound*.

3. It is important to learn the *proportions* of the *active preparations* in each lozenge.

4. They are chiefly made up with *refined sugar, gum acacia, mucilage, and water*; some have also *tincture of tolu*. *Extract of liquorice* is used in one instance instead of mucilage; and in another case *rose-water* instead of water.

5. The usual *method of preparation* is to “mix the dry ingredients, and add mucilage and water to form a proper mass. Divide into 720 lozenges, and dry them in a hot-air chamber with a moderate heat.” Some lozenges are prepared in a *special manner*.

XXX. UNGUENTA—OINTMENTS. The main facts relating to ointments may be thus summarized:—

1. They are of a *soft* but more or less *solid* consistence; and are intended for *external* use, being smeared over a surface, applied on lint or other material, or rubbed in.

2. They consist of *fatty* or *unctuous* substances, either *simple*, or *mixed* with various *active drugs*.

3. The *materials* employed in making ointments in different cases are:—

a. Prepared lard.

b. Benzoated lard.

c. Prepared lard and suet.

d. Prepared lard and olive oil.

e. Prepared lard and yellow wax.

f. *Simple ointment*, which consists of a mixture of prepared lard, white wax, and almond oil.

g. White or yellow wax and oil.

h. Yellow wax alone.

4. The *methods of preparation* are very diverse, but they may be thus classified:—

a. *Simple trituration* and thorough *mixing* of the ingredients.

b. *Dissolving* the active drugs in, or mixing them with spirit, water, nitric acid, oil, or other liquids, before mixing them with the firmer constituents.

c. *Melting* wax, resin, concrete oils, fats, etc., by means of a *gentle heat* (usually in a water-bath); then *stirring* thoroughly and constantly while cooling, and at the same time incorporating the dry ingredients in fine powder.

d. *Melting* the ingredients together; and either stirring while cooling; or straining through calico, flannel, or muslin.

e. *Special methods*.

XXXI. VAPORES—INHALATIONS. These are preparations intended to be inhaled by the patient, usually by means of a suitable "Inhaler." Those

which are officinal are each prepared in a particular way, and must be separately studied.

XXXII. VINA—WINES. The following general facts may be noted about these preparations:—

1. They are *solutions* of drugs or active principles in *wine*, which is employed partly on account of its alcohol, partly in some cases on account of its acid. Most are *simple*, a few *compound*.

2. The *solvent* is *sherry-wine* in all but three instances. *Vinum aurantii* is merely a fermenting saccharine solution, to which fresh peel of bitter orange has been added. This wine is used in the preparation of two others; in one *citric acid* being also added to aid solution.

3. The *methods of preparation* are:—

a. Usually by *maceration*; pressing and straining when required; and filtering.

b. Mere *solution* and filtering in some cases.

B. WEIGHTS AND MEASURES.

It is necessary to remember the weights and measures recognized in the B.P., with their abbreviations and signs, and these may conveniently be given here.

Weights { Granum or grain = gr.
 Uncia or ounce = oz. or \mathfrak{z} = 437.5 grains.
 Librum or Pound = \mathfrak{lb} = 16 ounces or 7000 grains.

Formerly the *drachma* or *drachm*, \mathfrak{z} = 60 grains, and the *scrupulum* or *scruple*, \mathfrak{s} = 20 grains, were recognized, and these signs are now frequently and legitimately used in prescribing.

Measures { Minimum or minim = \mathfrak{m} .
 Fluid drachm = fl. \mathfrak{z} = 60 minims.
 Fluid ounce = fl. \mathfrak{z} = 8 fluid drachms.
 Octarius or pint = O = 20 fluid ounces.
 Congium or gallon = C = 8 pints.

In the following pages only the *signs* will be used as a rule, and in the case of fluids, 3 and $\frac{3}{4}$ will be employed without the preceding fl., it being understood that these signs represent *measures* and not *weights*.

C. PHARMACEUTICAL OPERATIONS.

Many of the operations or processes connected with pharmacy have been sufficiently defined in discussing the groups of officinal preparations. There remain a few terms which will be frequently employed in these notes, in relation to pharmaceutical processes, and it will be well to indicate their meaning here.

Decantation. The removal of a supernatant liquid from a precipitate or sediment collected at the bottom of a vessel. It is effected by merely pouring it out, or by a syringe, syphon, or pipette.

Destructive Distillation. A process whereby organic bodies, being subjected to a high temperature, air being excluded, lose their original form, and yield new products.

Digestion. The process of dissolving a medicinal substance in a menstruum by the aid of sustained heat for a variable time, at a temperature a little below the boiling point.

Distillation. The process of separating volatile from fixed ingredients in solution. The liquid is heated to a sufficient temperature to produce vapour, and this is then condensed by cold in another part of the apparatus.

Elutriation. The process by which powders of different degrees of fineness are separated from each other. They are suspended and carefully diffused through water, the whole being allowed to stand for different intervals, the fluid being

decanted after each interval. The heaviest particles fall first.

Evaporation. The conversion of fluid into vapour by raising the temperature to various degrees, as may be required.

Filtration and Straining. The separation of solid particles from the fluids in which they are suspended. Straining is conducted rapidly, and is imperfect. Filtering is practised through various media according to circumstances (paper, calico, flannel, &c.), made into *filters*.

Lixiviation. The process used for the separation of the soluble from the insoluble parts of certain bodies. It is a variety of solution by *percolation*.

Maceration. The process of making a solution with a menstruum at the ordinary temperature of the air. The liquid is poured over the medicinal substance, and allowed to remain for a variable period.

Percolation. Filtering in such a way that the liquid shall come in contact with the whole of the contents of the filter, in order to obtain a medicated filtrate. The substance to be acted upon is suspended in the course of the menstruum, which thus dissolves out the required ingredients as it permeates through it.

Precipitation. The process by which a solid substance is separated from a fluid in which it was previously dissolved, either as crystals, amorphous powder, or magma. Usually the precipitate is thrown down.

Saturation. Pharmaceutically this signifies that a liquid has dissolved as much of a solid substance as it is capable of taking up.

Sublimation. The vaporisation of solid volatile substances by heat, by a process analogous to distillation (*dry distillation*), the vapour being afterwards condensed by cold.

Trituration. The pulverization of drugs, as performed by means of a pestle and mortar, &c.

Washing. The removal of impurities from precipitates, crystals, etc., by passing a stream of water or other fluid over them.

SECTION II.

THE INORGANIC KINGDOM.

In the inorganic kingdom we have to deal with drugs belonging to the three sub-divisions already indicated, namely:—1. **Non-metallic**, 2. **Metallic**, 3. **Special Chemical Compounds**. In the following pages however, it is not my intention to separate them thus absolutely, but to adopt a plan of arrangement which I have found practically useful and convenient, bringing together medicinal agents which are allied either pharmaceutically or therapeutically, in the following order:—

I. *Aqua—Water.*

II. *Carbo—Carbon or Charcoal.*

III. *Sulphur Group* { 1. Sulphur—Brimstone.
2. Sulphurous Acid.
3. Sulphuretted Hydrogen and Sulphides.
4. Hyposulphite of Sodium.

IV. *Chlorine and Hypochlorites.*

V. *Iodine and certain Iodides.*

VI. *Bromine.*

VII. *Phosphorus and Hypophosphites.*

VIII. *Acids (with some exceptions).*

IX. *Alkalies* { 1. Ammonium.
2. Potassium.
3. Sodium.
4. Lithium.

- | | |
|---------------------------------------|---|
| X. <i>Alkaline Earths</i> | { 1. Aluminium.
2. Calcium.
3. Magnesium.
4. Cerium. |
| XI. <i>Ordinary Metals</i> | { 1. Antimonium—Antimony.
2. Arsenicum—Arsenic.
3. Argentum—Silver.
4. Bismuthum—Bismuth.
5. Cadmium.
6. Cuprum—Copper.
7. Ferrum—Iron.
8. Hydrargyrum—Mercury.
9. Manganesium—Manganese.
10. Plumbum—Lead.
11. Zincum—Zinc.
12. Metals and Solutions in Appendix. |
| XII. <i>Special Chemical Products</i> | { 1. Hydrocyanic Acid.
2. Alcohol Group.
3. Ether Group.
4. Chloroform.
5. Hydrate of Chloral.
6. Nitrite of Amyl.
7. Carbolic Acid and Creosote. |

The consideration of each of the groups just enumerated is carried out according to a tolerably uniform plan, although it has to be varied somewhat in particular cases; and it may help to make the subject clearer by giving at the outset an explanatory sketch of this plan, as indicating the course of procedure which the student may advantageously adopt in learning the drugs belonging to the several groups.

1. A *general summary* of the members of each group is first given, including all the compounds and officinal preparations; the *nature* and *chemical composition* of the more important being also

pointed out. Thus a concise idea is obtained of the drugs belonging to a particular group.

2. The (a) *source*, and (b) *mode of preparation* of the simple drugs, and of what may be termed their "primary compounds," are then considered; the "secondary compounds" or *officinal preparations* being as a rule discussed later on under PHARMACY. In some instances each compound has to be learnt separately, but in others they can be conveniently discussed more or less in groups.

In describing the *mode of preparation* of the different drugs, I have endeavoured to state prominently and distinctly the several parts of the process, when it is at all a complicated one, without entering unnecessarily into details. I have also indicated the proportions of the ingredients ordered to be used. The student, however, need not burden his memory with these proportions, unless he wishes to do so; nor need he learn the exact words in which the preparation is described, but he should endeavour clearly to understand the process, and may then describe it in his own way.

It may be useful to point out here the general methods by which the officinal salts are made, which may help the student in remembering particular drugs. They may be stated as follows:—

a. By the purification of salts, either found in the native state, or produced during certain processes, such as burning wood (carbonate of potash), or the ripening of wine in casks (cream of tartar).

b. By dissolving metals in acids, either strong or diluted.

c. By dissolving oxides or salts, especially carbonates, in acids.

d. By the direct admixture and combination of the elements themselves.

- e.* By double decomposition of solutions of salts.
- f.* By fusing together solid substances.
- g.* By mixing together certain ingredients, and heating them in the dry state, the salt required being sublimed and then condensed.
- h.* By processes, more or less complicated and elaborate, each of which must be separately studied.

3. The *characters* and *properties* are next indicated, and I have endeavoured to bring out prominently each of these that is important, and in doing so have found it in several instances convenient to group the drugs or even to tabulate them. It must be insisted upon that the student ought to be quite familiar with the appearance and obvious characters of the solid preparations belonging to the inorganic kingdom, when these are at all striking, such as whether they are in powder or crystals, the size and form of the crystals, the colour, smell, &c. Moreover, the solubility of a substance in different menstrua is often a matter of considerable importance to remember, especially in relation to pharmacy. Other properties in many cases demand special recognition; and, amongst others, the changes to which preparations are liable on exposure to air or light, are frequently of much consequence.

4. The subject of *tests*, which naturally follows, or is hardly separable from what has just been considered, demands a few words of special comment, as this will save much repetition hereafter.

The *objects* for which tests are employed in the B.P., in relation to drugs belonging to the inorganic kingdom, may be thus indicated:—

- a.* To determine the *nature* of a drug. Each element, whether metallic or non-metallic, has its own peculiar tests; and in the case of salts, the acid present also yields its special tests.

In some instances it is further important to distinguish between different oxides and salts of the same metal, as in the case of iron and mercury.

b. In the course of certain *pharmaceutical processes*, to ascertain whether they are properly completed. Thus in washing precipitates to remove a soluble salt, the washings are tested to determine when they are free from this salt. The same principle is followed in some other cases.

c. To detect *impurities* and *adulterations*, whether resulting from the materials used in preparation, the vessels employed, accidental or intentional admixture, or decomposition.

d. For the *quantitative estimation* of a drug, so as to determine whether it is of proper composition and strength.

The student's knowledge of chemistry ought to have made him quite familiar with the principal tests by which the various drugs are recognized, as described in the B.P., and all that he has to do is to apply this knowledge in each case, in relation to non-metallic elements, metals, acids, oxides, salts, and special preparations. I have therefore felt justified in entirely omitting any reference to these tests in the account given of the different drugs; but it must be understood, once for all, that the student might be fairly required to mention these tests in an examination on Materia Medica. Further, I have not as a rule alluded to tests in relation to pharmaceutical processes, because the student can apply the same knowledge here; for instance, I merely state that a "precipitate is washed from such and such a salt;" the completion of this process being determined by testing the washings for the salt in question. With regard to impurities and adulterations again, I have deemed it sufficient to mention these, as given in the B.P., because to give their tests in each case would only

be to repeat the same thing over and over again, and the student may easily learn them once for all. A general summary of the chief impurities and their tests will be given immediately.

The *quantitative tests* are of considerable importance in several instances, and I have endeavoured to arrange and group these under a distinct heading in each case.

As regards the *nature* of the tests employed in the B.P., they are mainly:—

- a. The solubility in water or other menstrua.
- b. The effects of heat.
- c. Special chemical tests.

IMPURITIES AND ADULTERATIONS.—The chief impurities or adulterations in the drugs belonging to the inorganic kingdom recognised in the B.P., and their distinguishing tests in different cases, may be thus arranged:—

- | | | |
|---|---|---|
| a. Water . . . | { | 1. Moistens blotting paper. |
| | | 2. Loss of weight on drying. |
| | | 3. Turns anhydrous sulphate of copper blue (in alcohol). |
| | | 4. Absorbed by chloride of calcium. |
| b. Fixed impurities or adulterations —
Silica, Alumina,
Lime, &c. | { | Not volatilized by heat. |
| c. Chlorine . . . | | Odour. |
| d. Iodine or Iodides . | { | Blue colour, with mucilage of starch, when iodine is free or liberated. |
| e. Arsenic . . . | { | Deposit on copper foil when heated with it; other special tests. |

- | | | | |
|--|---|---|---|
| <i>f. Antimony</i> | . | . | Special tests. |
| <i>g. Certain Metals—</i> | | | |
| Lead, Copper, | { | | Discoloured or precipitated by H_2S ; and special tests. |
| Iron, &c. | | | |
| <i>h. Lime</i> | . | . | { White precipitate with oxalate of ammonia. |
| <i>i. Carbonates</i> | . | . | { 1. Effervesce with acids.
2. White precipitate with solution of lime. |
| <i>j. Hydrochloric Acid and Chlorides.</i> | | | { White precipitate with nitrate of silver. |
| <i>k. Nitric Acid and Nitrates</i> | . | . | { Dark purple colour in contact with protosulphate of iron and sulphuric acid. |
| <i>l. Oxalic Acid</i> | . | . | { White precipitate with sulphate of lime. |
| <i>m. Phosphoric Acid—</i> | { | | Dissolve in HCl; add tartaric acid and ammonia, and then solution of ammonio-sulphate of magnesia; a white precipitate is thrown down. |
| (In phosphate of iron) | | | |
| <i>n. Sulphurous Acid</i> | . | . | { 1. Reddens moistened litmus paper.
2. H_2S formed with granulated zinc in hydrochloric acid, which blackens paper moistened with solution of subacetate of lead.
3. Liberates iodine from iodate of potash in acetic acid, which colours starch blue. |

- o. *Sulphuric Acid and Sulphates* . . . (White precipitate with chloride of barium.

5. With regard to the *pharmacy* of the drugs belonging to the inorganic kingdom, the plan followed is (a) to consider the *officinal preparations*, giving their constituents and their proportions, with any important details as to their preparation; (b) to mention other preparations of which they are ingredients, or in making which they are employed; and (c) to point out the chief *incompatibles*.

6. As regards the *action* of the drugs, I have, as already intimated, merely stated in a word to what class or classes of therapeutic agents they severally belong, and even in doing this, I have deemed it sufficient, in many instances, to bring groups of drugs together.

AQUA—WATER = H₂O.

Simple water is recognized in the B.P. in two forms, namely:—

1. *Aqua*.—The purest natural water that can be obtained, cleared, if necessary, by filtration—It should be free from colour, smell, taste, and visible impurity. The most pure natural waters are ice from certain lakes, snow-water, and rain-water. All contain more or less organic and inorganic impurities.

2. *Aqua Destillata*—The purest water distilled from a copper still, through a block-tin worm; rejecting the first portion (which carries over the volatile impurities); and stopping the process after about three-fourths have passed over.

The purity of distilled water is tested by:—

a. The absence of any residue on evaporation.

b. The want of any effect upon its transparency or colour by the addition of solution of lime, sulphuretted hydrogen, chloride of barium, nitrate of silver, or oxalate of ammonia.

PHARMACY.—1. As already mentioned, there is a special group of pharmaceutical preparations recognized in the B.P., named *Aquæ*.

2. *Aqua destillata* is ordered to be employed in making a large number of pharmaceutical preparations and in the following pages it will be understood that *distilled water* is used whenever water is mentioned. Its advantages over natural water are:—*a.* Its purity. *b.* That it dissolves more of some substances than ordinary water. *c.* That there is less liability to decomposition.

CARBO-CARBON-CHARCOAL = C.

OFFICIAL VARIETIES.—There are three forms of carbon in the B. P., namely :—

1. *Carbo Ligni*—*Wood-charcoal*.—Carbon, with about 2 per cent. of alkaline and metallic salts.

2. *Carbo Animalis*—*Animal-charcoal* or *Bone-black*.—About 10 per cent. of carbon, the remainder consisting almost entirely of phosphate of lime, with a little carbonate of lime and iron carbide.

3. *Carbo Animalis Purificatus*—*Purified Animal-charcoal*.—Animal charcoal almost pure, the salts having been removed.

SOURCE AND PREPARATION. 1. *C. Ligni*—Heat to dull redness billets of wood (Poplar, Willow, Oak, Beech, Hazel) in cast-iron cylinders, with a limited supply of air. A residue of from 17 to 25 per cent. remains; while water, gases, and volatile matters pass off.

2. *C. Animalis*—Expose bones of oxen and sheep to red heat, without the access of air. Reduce the residue to powder.

3. *C. Animalis Purificatus*—Act upon animal charcoal for two days with **dilute hydrochloric acid** at a moderate heat; soluble lime-salts are formed; filter, wash and dry the residue; heat to redness in a covered crucible.

CHARACTERS AND PROPERTIES.—The properties of all the varieties of charcoal may be considered together.

1. *Appearance.*—(a) *C. Ligni*, black, brittle, light, porous pieces, presenting the shape and texture of the wood from which derived; (b) *C. Animalis*, a greyish-black, coarse powder; (c) *C. Animalis Purificatus*, a fine black powder.

2. All odourless and almost tasteless.
3. Insoluble in water.
4. Possess great power of absorbing and condensing gases, especially *wood-charcoal*, from its porosity. It acts best when recently made, or when kept in sealed bottles. After a time becomes inert, but its absorbent action is restored after exposure to a dull-red heat.
5. Also absorb odorous and septic matters; and oxidize them by means of oxygen taken up from the atmosphere.
6. Absorb organic colouring matters, alkaloids, bitter principles, &c., from solutions, especially *purified animal charcoal*.

PHARMACY.—1. *Officinal Preparation*.:—

Cataplasma Carbonis.—A poultice made with bread, linseed meal, and wood-charcoal, which is half mixed, and half sprinkled over the surface of the poultice.

2. *Purified animal charcoal* is much used in pharmacy as a decolourizing agent in the preparation of alkaloids, &c.; *wood-charcoal* is employed in preparing sulphurous acid.

ACTION.—Antiseptic. Absorbent. Purified animal charcoal is an antidote to certain poisonous alkaloids.

SULPHUR GROUP.

It will be convenient here to consider not only sulphur, but also certain unstable compounds of this element, which are employed for similar or allied therapeutic effects.

I. SULPHUR—BRIMSTONE. S.

GENERAL SUMMARY.—1. *Sulphur Sublimatus*—*Sublimed Sulphur* or *Flowers of Sulphur*.

2. *Sulphur Præcipitatum*—*Lac Sulphuris* or *Milk of Sulphur*.

3. *Officinal Preparations*.— $\left\{ \begin{array}{l} a. \text{ Confectio Sulphuris.} \\ b. \text{ Unguentum Sulphuris.} \end{array} \right.$

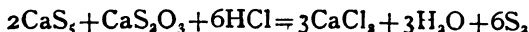
SOURCE AND PREPARATION.—1. *Sulphur Sublimatum*. Heat **virgin** or **native sulphur** or a **sulphide**, and condense the vapour of sulphur which sublimes in a proper chamber.

2. *Sulphur Præcipitatum*. By a complicated process, consisting essentially of the following parts:—

a. Boil $\left\{ \begin{array}{l} \text{Sublimed Sulphur.} \\ \text{Slaked Lime.} \\ \text{Water.} \end{array} \right\}$ and filter.



b. Dilute the cooled filtrate with water, and add in successive quantities **diluted hydrochloric acid** until effervescence ceases, and the mixture acquires an acid reaction.



c. Allow the precipitate to settle, decant off the supernatant fluid, and wash the deposit with water, until this ceases to give an acid reaction, and to precipitate with oxalate of ammonia.

d. Collect the precipitate on a calico filter, wash with water, and dry at a temperature not above 120° .

CHARACTERS AND PROPERTIES.—The two varieties of sulphur have similar properties, except as regards their obvious physical characters.

1. *S. Sublimatum* is a bright or citron-yellow gritty powder, or may be cast into moulds. *S. Præcipitatum* is pale yellow or greyish-yellow, soft, and not gritty. Under the microscope it presents opaque globules, without any crystals.

2. Tasteless, and odourless unless heated.

3. No reaction, and no reddening of moistened litmus paper.

4. Insoluble in water, but soluble in bisulphide of carbon, hot oil of turpentine, and slightly in fixed oils, especially on boiling.

5. Entirely volatilized by heat; burns in air with a blue flame, and emits a suffocating odour, SO_2 , being evolved.

IMPURITIES.—These are SO_2 ; H_2S ; fixed impurities, especially calcic sulphate, H_2SO_4 being used in preparation; and arsenic as As_2S_3 , which, when agitated with solution of ammonia, filtered, and evaporated, leaves a residue, giving tests of arsenic.

PHARMACY.—I. *Official Preparations*:—

a. <i>Confectio Sulphuris.</i>	Mix	{	Sublimed Sulphur, 4
			Bitartrate of Potash, 1
Dose—gr. 60 to 120.			Syrup of Orange, 4

b. <i>Unguentum Sulphuris.</i>	Mix	{	Sublimed Sulphur, 1
			Benzoated Lard, 4

2. Sublimed sulphur is { Iodide of Sulphur
used in the prepara- { Sulphuric Acid
tion of { Sulphurated Potash.

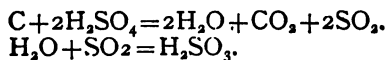
It is also an ingredient in
Emplastrum Hydrargyri, and
Emplastrum Ammoniaci cum Hydrargyro,
being used as a means of facilitating the sub-
division of the mercury.

ACTION.—Laxative. Diaphoretic. Resolvent. Para-
siticide. Disinfectant when burnt.

II. ACIDUM SULPHUROSUM—SULPHUROUS ACID. H_2SO_3 .

When sulphur is burnt, sulphurous anhydride gas— SO_2 —is produced, and it is often used therapeutically in this form. The sulphurous acid of the B.P. is a nearly saturated solution of this gas in water = 9.2 per cent. by weight. The SO_2 combines with water to form H_2SO_3 = 11.8 per cent.

SOURCE AND PREPARATION.—By heating **sulphuric acid** with **wood charcoal** in a glass flask. The SO_2 gas is passed through a wash-bottle, and then into distilled water in a cooled receiver.



CHARACTERS AND PROPERTIES:—

1. A colourless liquid of sp. gr. 1.040.
2. Strong and pungent sulphurous suffocating odour.

3. Leaves no residue on evaporation.
4. A powerful decolourizing, deodorizing, and disinfecting agent; also arrests fermentation and putrefaction.
5. Gives little or no precipitate with chloride of barium, until solution of chlorine is added = absence of sulphuric acid, which forms by long keeping.

QUANTITATIVE TEST.—31·7 grains mixed with $\frac{3}{4}$ of water and a little mucilage of starch, do not acquire a permanent blue colour with the *Vol. solution of iodine*, until 1000 grain-measures of the latter have been added.

ACTION.—Disinfectant. Antiseptic. Destructive to vegetable life.

III. SULPHURETTED HYDROGEN AND SULPHIDES.

1. *Sulphuretted Hydrogen* = H_2S . This is a powerful agent, and is present in a class of mineral waters—*Sulphuretted Waters*—which smell like rotten eggs. Some of these also contain alkaline sulphides.

In the B.P. it is only inserted in the *Appendix*, for the purpose of testing for various metals. It is used as a gas, prepared by the action of **sulphuric acid** on **sulphide of iron**.

2. *Ammonium Sulphide*. = NH_4HS . This is also only recognized in the *Appendix* of the B.P., in the form of a test-solution, prepared by passing a stream of H_2S into solution of ammonia to saturation, adding solution of ammonia, and preserving in a green-glass stoppered bottle.

3. *Potassa Sulphurata*—*Sulphurated Potash*—*Hepar Sulphuris*—*Liver of Sulphur*. This is the only alkaline sulphide which is officinal in the body of the B.P. It is of uncertain composition, but consists chiefly, (about three-fourths) of potassium sulphide = K_2S_3 , with some hyposulphite, sulphate, and sulphite.

SOURCE AND PREPARATION :—

a. Mix together { **Carbonate of potash.**
 { **Sublimed sulphur.**

and heat in a crucible, first gradually until effervescence ceases, and then to dull redness until they are perfectly fused.



b. Pour out the fused liquid, and cool, air being excluded as much as possible.

c. Break the solid mass into fragments, and preserve in a green-glass, closely-stoppered bottle.

Too much heat causes decomposition of the hyposulphite into sulphate and sulphite.

CHARACTERS AND PROPERTIES :—

1. Irregular amorphous masses or fragments.
2. Greenish, or grey, or liver-brown colour, but readily becomes dull white when exposed to the air, from oxidation, sulphate being formed.
3. Brittle; slightly deliquescent.
4. Strong odour of H_2S , especially when moistened.
5. Disagreeable, alkaline, and acrid taste.
6. Readily soluble in water, forming a yellow solution, with the smell of H_2S ; about three-fourths soluble in rectified spirit.

PHARMACY.—*Officinal Preparation* :—

Unguentum Potassæ { Sulphurated Potash, gr. 30
 { *Sulphurata* { Prepared Lard, $\frac{3}{4}$ i

ACTION.—Irritant. Antiseptic. Alterative.

IV. HYPOSULPHITE OF SODA.

Although used therapeutically, this drug is at present only recognised in the *Appendix* of the B.P., as a *volumetric test-solution*, containing 24·8 grains in 1000 grain measures of water, for the purpose of estimating free *iodine*, and thus indirectly determining the amount of *chlorine* in certain compounds.

V. SPECIAL COMPOUNDS.

Two other preparations containing sulphur may be mentioned here, to complete the list, namely:—SULPHURIS IODIDUM, and ANTIMONIUM SULPHURATUM. These will be more conveniently considered under IODINE and ANTIMONY respectively.

CHLORINE GROUP.

GENERAL SUMMARY.—In this group may be included the following, which either contain free chlorine, or readily evolve this gas.

1. *Liquor Chlori*.—Solution of chlorine gas in about half its volume of water = ·6 per cent. of the solution by weight, or gr. 2·66 to $\frac{3}{4}$ i.

2. *Calx Chlorata*—*Chlorinated lime*.—A mixture of calcium hypochlorite (CaCl_2O_2), calcium chloride, and some lime = about 30 per cent. of chlorine.

a. *Liquor Calcis Chloratæ*.

b. *Vapor Chlori*.

3. *Liquor Sodæ Chloratæ*.—Solution of sodic hypochlorite (NaClO), sodium chloride, and sodic bicarbonate.

a. *Cataplasma Sodæ Chloratæ*.

I. LIQUOR CHLORI—SOLUTION OF CHLORINE.

SOURCE AND PREPARATION.—By heating gently **hydrochloric acid, black oxide of manganese, and water**; passing the liberated chlorine gas through water in a wash-bottle; and receiving into a large bottle containing water, and kept cool, which is then shaken till all the gas is absorbed. Keep in a green glass bottle, in a cool place.



CHARACTERS AND PROPERTIES:—

1. A yellowish-green liquid.
2. Strong odour of chlorine; acrid, and very irritating to the air-passages.
3. Leaves no residue on evaporation.
4. Powerful bleacher, disinfectant, and deodorant, replacing hydrogen in many organic compounds.
5. The solution is readily decomposed in the light, forming HCl and O .

QUANTITATIVE TEST.—20 Grains of iodide of potassium, dissolved in $\frac{3}{4}$ i of water, and added to $\frac{3}{4}$ i or 439 grains of liquor chlori, the mixed solution acquires a deep-red colour, which requires for its discharge 750 grain-measures of *Vol. solution of hyposulphite of soda*.

ACTION.—Stimulant. Disinfectant. Antiseptic.
Dose— $\text{m}\frac{10}{10}$ to 20.

III. LIQUOR SODÆ CHLORATÆ.

PREPARATION.—Dissolve **sodic carbonate** in water, and pass **chlorine** gas into the solution until it reaches the sp. gr. 1.103. Keep in a stoppered bottle, in a cool and dark place.

CHARACTERS AND PROPERTIES:—

1. A colourless liquid.
2. Alkaline in reaction.
3. Has the smell and properties of chlorine, like Calx chlorata.

QUANTITATIVE TEST.—31 or 70 grains added to $\left\{ \begin{array}{l} \text{Iodide of potassium} = \text{gr. } 20 \\ \text{Water} = \frac{3}{4} \end{array} \right\}$, and acidulated with 32 of HCl, the mixture assumes a brown colour, requiring for its discharge 500 grain-measures of *Vol. solution of hyposulphite of soda*.

PHARMACY.—*Official Preparation:*—

Cataplasma Sodæ Chloratæ.—A linseed meal poultice made with Liquor sodæ chloratæ.

ACTION.—Disinfectant. Antiseptic. Stimulant.
Dose—m℥10 to 20.

IODINE GROUP.

GENERAL SUMMARY.—It may be useful to give here a complete list of the preparations of IODINE, and of the officinal IODIDES and their compounds. Some of the latter will be also considered in this connection, as they are practically employed for the iodine which they contain; others will be more conveniently discussed elsewhere, as they are combinations of iodine with other powerful medicines, and are used therapeutically for their combined effects.

1. *Iodum—Iodine.*
2. *Official Preparations* $\left\{ \begin{array}{l} a. \text{ Linimentum iodi.} \\ b. \text{ Liquor iodi.} \\ c. \text{ Tinctura iodi.} \\ d. \text{ Unguentum iodi.} \\ e. \text{ Vapor iodi.} \end{array} \right.$
containing free
Iodine . . .
3. *Cadmii Iodidum.*
a. Unguentum cadmii iodidi.
4. *Ferri Iodidum.*
a. Syrupus ferri iodidi.
b. Pilula ferri iodidi.
5. *Hydrargyri Iodidum Viride.*
6. *Hydrargyri Iodidum Rubrum.*
a. Unguentum hydrargyri iodidi rubri.
7. *Plumbi Iodidum.*
a. Emplastrum plumbi iodidi.
b. Unguentum plumbi iodidi.
8. *Potassii Iodidum.*
a. Linimentum potassii iodidi cum sapone.
b. Unguentum potassii iodidi.
9. *Sulphuris Iodidum.*
a. Unguentum sulphuris iodidi.
10. *Test-solutions* $\left\{ \begin{array}{l} a. \text{ Volumetric solution of iodine.} \\ b. \text{ Test-solution of iodide of pot-} \\ \text{assium.} \\ c. \text{ Test-solution of iodate of pot-} \\ \text{ash.} \end{array} \right.$
in Appendix

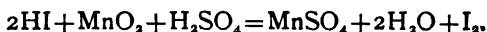
I. IODUM—IODINE. I.

SOURCE AND PREPARATION.—From “kelp,” the burnt ashes of sea-weeds, by the following process:—

1. The salts are dissolved out by water.
2. The solution is concentrated, and certain salts are crystallized out.

3. The remaining solution is treated with **sulphuric acid**. Hydriodic acid is formed; gases escape; and sodic sulphate, mixed with sulphur, crystallizes out.

4. **Black oxide of manganese** is added to the acid solution, which is then heated. The iodine volatilizes, and is condensed in receivers.



CHARACTERS AND PROPERTIES:—

1. In scaly or laminar crystals, of variable size.
2. Dark colour, with metallic lustre.
3. Volatile, with a marked and peculiar odour, somewhat like chlorine.
4. Melts when heated; then sublimes entirely, in the form of a beautiful violet-coloured vapour.
5. Soluble in 7000 parts of water; 12 of rectified spirit; 4 of ether; sparingly in glycerine; readily in solution of iodide of potassium; also soluble in chloroform and benzine.
6. Readily penetrates animal textures, and stains the skin yellow.

TESTS AND IMPURITIES.—1. Iodine in solution gives a deep-blue colour with starch.

2. Its impurities and their tests are:—

- a. Water—moistens blotting-paper.
- b. *Iodide of Cyanogen*—first portion that sublimes includes slender colourless prisms, emitting a pungent odour.
- c. Fixed impurities or *adulterations* (charcoal, plumbago, iron, black oxide of manganese, &c.).

3. *Quantitative test*.—1000 grain-measures of *Vol. solution of sodic hyposulphite* required for the complete decolouration of 12·7 grains of iodine, dissolved in $\frac{3}{4}$ of water with 15 grains of iodide of potassium.

Liquid Preparations.

There are three liquid preparations of iodine, in all of which iodide of potassium is present to aid solution. It will be observed that they differ considerably in their relative strength. They are all made by merely dissolving the ingredients in the several menstrua.

- a. *Limimentum Iodi* = 1 in 9.
Iodine, 5.
Iodide of potassium, 2.
Camphor, 1.
Rectified spirit, 40.
Intense blood colour.
- b. *Liquor Iodi* = 1 in 24.
Iodine, gr. 20.
Iodide of potassium, gr. 30.
Distilled water, $\frac{3}{4}$ 1.
Deep blood colour.
- c. *Tinctura Iodi* = 1 in 40.
Iodine, $\frac{3}{4}$ 1.
Iodide of potassium, 3 2.
Rectified spirit, $\frac{3}{4}$ 20.
Intense brown-red.
- Dose*—m 5 to 20.

d. *Unguentum Iodii.*

Iodine, gr. 32.

Iodide of potassium, gr. 32.

Proof spirit, 32

Prepared lard, 3 2

Rub the solid ingredients with the spirit, and mix with the lard.

e. Vapor Iodi.—This vapor is made by simply

mixing { Tincture of iodine, 3 i } in a suit-
 { Water, 3 i }

able apparatus, and applying a gentle heat.

2. Iodine is used in the preparation of iodides of cadmium, potassium, and sulphur; green iodide of mercury; and the pill and syrup of iodide of iron.

3. *Incompatibles*.—Ammonia, metallic salts, mineral acids, vegetable astringents.

ACTION.—Antiseptic. Irritant. Alterative. Absorbent.

II. CADMII IODIDUM—IODIDE OF CADMIUM. CdI_2 .

PREPARATION.—By the direct combination of **iodine** and **cadmium** in presence of water; or by decomposing **sulphate of cadmium** by **iodide of barium**.

CHARACTERS AND PROPERTIES:—

1. Flat micaceous crystals.
2. White, with a pearly lustre.
3. *Solubility*.—1 in $1\frac{1}{2}$ of water; 1 in 2 of rectified spirit; 1 in 3 of glycerine.
4. Melts at 600°F. , forming an amber-coloured fluid. At a dull-red heat iodine-vapour is given off.

QUANTITATIVE TEST.—10 grains dissolved in water, and nitrate of silver added in excess, give a precipitate which, when washed first with water, and afterwards with $\frac{3}{2}$ of solution of ammonia, and dried, weighs 12.5 grains.

PHARMACY.—*Officinal Preparation:*—

<i>Unguentum Cadmii</i>	{	Iodide of cadmium, 1	}	n
<i>Iodidi</i>				

ACTION.—External absorbent.

III. SULPHURIS IODIDUM—IODIDE OF SULPHUR. SI .

PREPARATION:—

1. Rub to- { **Iodine**, 4 } in a dry
 gether { **Sublimed sulphur**, 1 } mortar.
2. Transfer to a flask, and heat, first gently, and afterwards more strongly, until thoroughly liquefied.
3. Allow to cool and solidify; break the flask and reduce the mass to pieces; keep in a well-stoppered bottle.

CHARACTERS AND PROPERTIES:—

1. In crystalline masses.
2. Bluish-black and metallic-looking.
3. Strong odour of iodine.
4. Insoluble in water; soluble in glycerine (1 in 60.)
5. Very unstable. 100 grains boiled in water give off iodine vapour, and 20 grains of sulphur remain.

PHARMACY.—*Officinal Preparation*:—

Unguentum Sulphuris Iodidi { Iodide of sulphur, gr. 30 } mix.
 { Lard, 3 i }

ACTION.—External stimulant and absorbent.

BROMINE GROUP.

GENERAL SUMMARY.—It will be well to give a list here of all the officinal compounds containing bromine. They are very limited, namely:—

1. *Bromum—Bromine.*
2. *Solution of Bromine* in the *Appendix*, employed as a *test-solution*.
3. *Ammonii Bromidum.*
4. *Potassii Bromidum.*

Several other bromides, as well as hydrobromic acid, are used therapeutically, but they are not officinal. Only bromine will be further considered here.

BROMUM—BROMINE. Br.

SOURCE AND PREPARATION.—From “bittern,” the liquid left after crystallizing chloride of sodium out of sea-water, and from some saline springs. These contain bromide of magnesium.

1. Pass a current of **chlorine** gas through the liquid. This combines with the magnesium, and sets bromine free.

2. Shake up with **ether**. The bromine is dissolved, and rises to the surface.

3. Purify by converting the bromine into **bromide of potassium**, and decomposing this salt by **black oxide of manganese** and **sulphuric acid**.

CHARACTERS AND PROPERTIES :—

1. A dark brownish-red and heavy liquid.

2. Highly volatile, giving off red fumes at the ordinary temperature; and boils at 117°.

3. Strong and intensely disagreeable acrid odour and taste; the vapour being extremely irritating to the respiratory mucous membrane.

4. Slightly soluble in water (1 in 30); soluble in alcohol and ether.

5. The aqueous solution renders cold starch water yellow; if it contains iodine, it will turn it blue.

PHARMACY.—Bromine is employed in preparing the officinal bromides.

PHOSPHORUS GROUP.

GENERAL SUMMARY.—In this group may be conveniently included :—

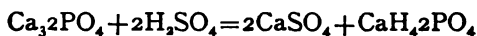
1. *Phosphorus* { *a.* Oleum phosphoratum.
 b. Pilula phosphori.
2. *Calcis Hypophosphis*—*Hypophosphite of Lime*.
3. *Sodæ Hypophosphis*—*Hypophosphite of Soda*.

I. PHOSPHORUS. P.

SOURCE AND PREPARATION.—From bone-ash, which consists chiefly of phosphate of lime, by a somewhat complicated process.

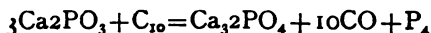
1. Digest the bone-ash with **diluted sulphuric**

acid. Superphosphate and sulphate of lime are formed.



2. Filter and evaporate the solution of superphosphate, when metaphosphate, Ca_2PO_3 is formed.

3. Mix with **charcoal**, and heat. Phosphorus sublimes, and is collected in a receiver filled with cold water.



4. Purify by melting under water, and shaking with a mixture of **bichromate of potash** and **sulphuric acid**.

5. Melt and cast into moulds.

CHARACTERS AND PROPERTIES.—Phosphorus occurs in an *ordinary* and an *allotropic* form, but the former is alone officinal.

1. A soft solid, usually in waxy-looking pipes or moulds.

2. Almost colourless and transparent when fresh, but tends to become opaque and white, or reddish on the surface, from oxidation.

3. Luminous in the dark, and emits white vapours when exposed to the air.

4. Insoluble in water, in which it is kept. Soluble in ether, olive oil, melted fats, naphtha, boiling oil of turpentine, and bisulphide of carbon; sparingly in boiling rectified spirit.

5. Melts at 108° ; highly inflammable, forming when burnt phosphoric anhydride (P_2O_3).

PHARMACY.—I. *Official Preparations* :—

a. *Oleum Phosphoratum*.

Phosphorus, gr. $\frac{12}{32}$

Almond oil, $\frac{3}{4}$ =

gr. $\frac{1}{8}$ in m5.

Dose—m5 to 10.

} Dissolve by heating in a water-bath to 180° , and frequently shaking.

b. Pilula Phosphori.

Phosphorus, gr. 2
 Balsam of tolu, gr. 120
 Yellow wax, gr. 60 =
 gr. $\frac{1}{18}$ th in gr. 5.

Melt the phosphorus and balsam in hot water in a mortar; then rub together under water until no particles of phosphorus are visible, at a temperature of about 140° , add the wax and when soft blend all thoroughly together.

Dose—gr. 3 to 6.

Should be kept in water; and softened with rectified spirit before it is made into pills.

2. Phosphorus is used for making *acidum phosphoricum dilutum* and *calcis hypophosphis*.

ACTION.—Nervine and general tonic. General stimulant.

II. CALCIS HYPOPHOSPHIS—HYPOPHOSPHITE OF LIME. $\text{Ca}_2\text{PH}_2\text{O}_6$.

SOURCE AND PREPARATION:—

1. Heat **phosphorus** with **calcic hydrate** and **water** until phosphuretted hydrogen gas ceases to be evolved.

2. Filter, and separate any uncombined lime by means of **carbonic anhydride** gas.

3. Evaporate the remaining solution until the hypophosphite crystallizes out. Purify by recrystallization.

CHARACTERS AND PROPERTIES:—

1. In small crystals.
2. White, with a pearly lustre.
3. Soluble in cold and hot water (1 in 8); insoluble in rectified spirit.
4. Bitter nauseous taste.
5. Ignites when heated to redness, giving off phosphuretted hydrogen.

ACTION.—Like Phosphorus.

III. SODÆ HYPOPHOSPHIS—HYPOPHOSPHITE OF SODA. NaPH_2O_2 .

SOURCE AND PREPARATION:—

1. Add **sodic carbonate** to a solution of **calcic hypophosphite** so long as calcic carbonate is precipitated.

2. Filter, and evaporate by the steam-bath to dryness, constantly stirring when it begins to solidify.

CHARACTERS AND PROPERTIES:—

1. A white granular salt.
2. Deliquescent.
3. Very soluble in water (1 in 1); glycerine (1 in 2); sparingly in spirit.
4. Bitter nauseous taste.
5. Ignites at a red heat, and gives off phosphuretted hydrogen.

ACTION.—Like Phosphorus.

THE OFFICINAL ACIDS.

GENERAL SUMMARY.—It will be useful to give here, at the outset, a complete list of the acids recognised in the B.P. as separate preparations.

A. Inorganic Liquid Acids.

1. *A. Hydrochloricum*.—A solution of HCl gas in distilled water = 31·8 per cent. by weight.

2. *A. Hydrochloricum Dilutum* = 10·58 per cent. of HCl, or 36·5 grains in 6 drachms.

3. *A. Nitricum—Aqua Fortis*.—A solution of HNO_3 in water = 70 per cent. by weight, or 60 per cent. of anhydrous N_2O_5 .

4. *A. Nitricum Dilutum* = 14·95 per cent. of anhydrous N_2O_5 .

5. *A. Nitro-hydrochloricum Dilutum*.—A mixture of nitric and hydrochloric acids, with water, also containing free chlorine and nitroxyl-chloride NO_2Cl .

6. *A. Phosphoricum Dilutum*.—A solution of H_3PO_4 in water = 10 per cent. of anhydrous P_2O_5 ; or 35·5 grains in 6 drachms.

7. *A. Sulphuricum—Oil of Vitriol*.—A strong acid, containing 96·8 per cent. of H_2SO_4 = 79 per cent. of SO_3 .

8. *A. Sulphuricum Dilutum* = 10·14 of SO_3 , or 40 grains in 6 drachms.

9. *A. Sulphuricum Aromaticum*.—A form of dilute sulphuric acid = 10·91 per cent. of SO_3 , or 33·2 grains in 6 drachms; but also containing other ingredients, namely, rectified spirit, cinnamon, and ginger.

10. *A. Sulphurosum*.— H_2SO_3 . A nearly saturated solution of sulphurous anhydride gas (SO_2) in water = 9·2 per cent. by weight. The SO_2 combines with the water to form H_2SO_3 .

B. Inorganic Solid Acids.

1. *A. Arseniosum—White Arsenic*.— As_2O_3 .

2. *A. Boracicum*.—This acid is not in the *body* of the *B.P.*, but a solution in rectified spirit (50 grains in $\frac{3}{4}$ 1) is in the *Appendix*, for the purpose of testing for turmeric as an adulteration in rhubarb.

C. Simple Organic Acids.

1. *A. Aceticum*.—A solution of 33 per cent. of $\text{HC}_2\text{H}_3\text{O}_2$; or 28 per cent. of $\text{C}_4\text{H}_6\text{O}_3$.

2. *A. Aceticum Glaciale*.—A concentrated form of acetic acid, containing at least 84 per cent. of $\text{C}_4\text{H}_6\text{O}_3$.

3. *A. Aceticum Dilutum* = 3·63 per cent. of $\text{C}_4\text{H}_6\text{O}_3$; or 16 grains in $\frac{3}{4}$ 1.

4. *Acetum—Vinegar*.—An acid liquid containing about 4·6 per cent. of anhydrous acetic acid.

5. *A. Citricum*—*Citric Acid*.— $\text{H}_3\text{C}_6\text{H}_5\text{O}_7 + \text{H}_2\text{O}$.
6. *A. Tartaricum*—*Tartaric Acid*.— $\text{H}_2\text{C}_4\text{H}_4\text{O}_6$.
7. *A. Oxalicum*.— $\text{H}_2\text{C}_2\text{O}_4 + 2\text{H}_2\text{O}$, a *volumetric solution* in the *Appendix*, to test the strength of various preparations.

D. Special Organic Acids.

1. *A. Benzoicum*—*Benzoic Acid*.— $\text{HC}_7\text{H}_5\text{O}_2$.
2. *A. Carbolicum*—*Carbolic Acid*.— $\text{HC}_6\text{H}_5\text{O}$.
3. *A. Gallicum*—*Gallic Acid*.— $\text{H}_3\text{C}_7\text{H}_3\text{O}_5, \text{H}_2\text{O}$.
4. *A. Hydrocyanicum Dilutum*—*Prussic acid*.—A solution of HCN gas in water = 2 per cent.
5. *A. Tannicum*—*Tannic Acid*.— $\text{C}_{27}\text{H}_{22}\text{O}_{17}$.

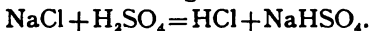
This list includes all the acids separately recognized in the B.P., but there are others which form important constituents of certain drugs; while some non-official acids (salicylic, lactic, &c.) are also much employed therapeutically at the present time.

Many of the acids just enumerated present considerable differences from each other, as regards their actions and uses; and the only characters they possess in common are that they have almost all a more or less acid reaction, and that they combine with bases to form salts. For practical purposes, therefore, it will be better only to treat further here of those which are used for their properties as acids, the others being more conveniently referred to in other portions of these notes, to which they appropriately belong. *Sulphurous Acid* has already been considered (see p. 39).

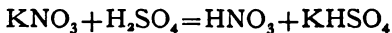
The ordinary acids may be discussed under certain groups.

I. THE STRONG LIQUID INORGANIC ACIDS.

SOURCE AND PREPARATION.—1. *Hydrochloric*.—By the action of **sulphuric acid**, diluted with **water**, upon **chloride of sodium** in a glass flask, aided by heat. The gas is passed through a wash-bottle to remove all traces of H_2SO_4 , and then into a cooled receiver containing distilled water.



2. *Nitric*.—By heating equal weights of **sulphuric acid** and **nitrate of potash** in a glass flask, and collecting the liberated acid in a receiver. It is heated to expel nitrous acid, which also passes over.



3. *Sulphuric*. By a complicated process, described at length in chemical works, but essentially as follows:—

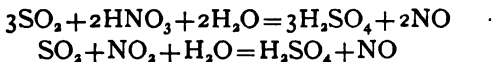
Pass into a leaden chamber containing water:—

a. SO_2 , made by burning **sulphur** or **iron pyrites**.

b. Nitric acid fumes, produced by the action of **sulphuric acid** on **nitrate of potash**.

c. Steam and air.

The SO_2 takes up O from the HNO_3 , and becomes SO_3 , which combines with water to form H_2SO_4 , while nitric oxide— NO , is produced. This takes up O from the air, and becomes converted into peroxide of nitrogen— NO_2 , which again yields O to fresh SO_2 , becoming reduced to NO , and this process goes on indefinitely, the NO acting as a carrier of O from the air to the SO_2 . An intermediate compound of uncertain nature is supposed to be formed between NO_2 , SO_2 , and H_2O .



At a sp. gr. of 1.5 the sulphuric acid is drawn

off; evaporated in shallow leaden pans to sp. gr. 1.72; and lastly concentrated in glass or platinum retorts to sp. gr. 1.84.

CHARACTERS AND PROPERTIES.—The chief facts to be remembered under this head respecting the strong acids may be thus summarized:—

1. In *appearance* they should be colourless and transparent liquids, but are usually more or less coloured from impurities. Sulphuric acid has a somewhat oily consistence.

2. Intensely acid in taste and reaction.

3. Readily combine with water. Hydrochloric and nitric acids emit pungent and acrid suffocating vapours, combining with the atmospheric moisture. Sulphuric acid absorbs water very rapidly, with condensation and elimination of much heat.

4. Powerfully corrosive, especially sulphuric acid, which chars and blackens many organic substances.

5. Sp. gr. $\left\{ \begin{array}{l} \text{Hydrochloric, } 1.160. \\ \text{Nitric, } 1.420. \\ \text{Sulphuric, } 1.843. \end{array} \right.$

6. Neutralizing power:—

<i>Hydrochloric</i> , 114.8 gr.	$\left\{ \begin{array}{l} \text{Neutralize 1000 grain-} \\ \text{measures of Vol. sol.} \\ \text{of soda} = 40 \text{ grains of} \\ \text{NaHO.} \end{array} \right.$
<i>Nitric</i> , 90 gr.	
<i>Sulphuric</i> , 50.6 gr.	

7. Dissipated by heat, leaving no residue.

IMPURITIES.—1. All the acids are liable to contain fixed impurities, such as earthy matters, metals, &c.

2. The chief special impurities to which each acid is liable, are as follows:—

a. Hydrochloric.—Sulphuric acid or sulphates; metals; arsenic; sulphurous acid.

b. Nitric.—Hydrochloric acid; sulphuric acid.

c. Sulphuric.—Sulphate of lead; arsenic; nitric acid.

ACTION.—Caustic or Escharotic.

II. DILUTE INORGANIC ACIDS.

PREPARATION.—1. The *simple dilute acids* are made by gradually adding distilled water to the strong acid, in such proportions, that in each case the mixture measures a certain bulk when cooled to 60° F., as follows:—

	Acid.		Diluted.
a. <i>Hydrochloric</i>	8	...	26½
b. <i>Nitric</i>	6	...	31
c. <i>Sulphuric</i>	7	...	83½.

2. *Acidum Nitro-Hydrochloricum Dilutum.*

- a. Mix { **Hydrochloric acid, 4**
Nitric acid, 3

and allow to remain for 24 hours in a bottle, the mouth of which is partially closed. This is for the liberation of chlorine.

b. Add **water**=25, in successive portions, shaking the bottle after each addition.

3. *Acidum Sulphuricum Aromaticum.*

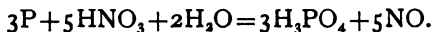
- a. Mix gradually { **Sulphuric acid, 3**
Rectified spirit, 40

- b. Add { **Cinnamon powder, 2**
Ginger powder, 1½

c. Macerate for 7 days, and filter.

4. *Acidum Phosphoricum Dilutum.*—This acid is prepared by a somewhat complicated process, but essentially it consists of the following parts:—

a. Act by **diluted nitric acid** upon **phosphorus** in a retort, distilling slowly by a gentle heat, and returning the distillate at intervals until the phosphorus has entirely disappeared.



b. Evaporate the liquid in porcelain and platinum vessels, until orange-coloured vapours are no longer formed.

c. Dilute what remains with distilled water to the proper strength.

CHARACTERS AND PROPERTIES.—1. With regard to the diluted preparations of the strong mineral acids already considered, it will be sufficient to remember the following facts:—

a. They are all colourless, except *acidum sulphuricum aromaticum*, which is deep-red.

b. They present the usual acid taste and other properties.

c. The sp. gr. and neutralizing power of the diluted acids are as follows:—

	Sp. Gr.	Neutralizing Power.
<i>Hydrochloric</i>	1.052	In each case 6 fluid drachms require for neutralization 1000 grain-measures of Vol. solution of soda.
<i>Nitric</i>	1.101	
<i>Sulphuric</i>	1.094	
<i>Nitro-hydrochloric</i>	1.070	{ 6 fluid drachms = about 900 grain-measures.
<i>Aromatic Sulphuric</i>	0.927	{ 6 fluid drachms = about 830 grain-measures.

2. *Dilute Phosphoric Acid* calls for separate notice.

a. A colourless liquid.

b. Odourless; has an agreeable acid taste.

c. Sp. gr. 1.080.

d. Evaporated it leaves a residue, which melts at a low red heat, and on cooling exhibits a glassy appearance.

IMPURITIES.—Metals; sulphuric, hydrochloric, or nitric acid; metaphosphoric acid, which gives a precipitate with solution of albumen.

QUANTITATIVE TEST.—fl. 36 poured upon 180 grains of oxide of lead in fine powder, leave after evaporation a residue which, heated to redness, weighs 215.5 grains.

ACTION.—Refrigerant. Tonic. Astringent. Stomachic. External irritant or stimulant.

III. SIMPLE ORGANIC ACIDS.

A. ACETIC ACID GROUP.

SOURCE AND PREPARATION:—

1. *Acidum Aceticum*. Prepared as follows:—

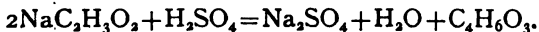
a. Subject wood to destructive distillation at a heat of low redness in iron retorts.

b. Decant the crude pyroligneous acid in the distillate from the tar, and re-distil.

c. Neutralize the acetic acid which comes over with **carbonate of soda**, and purify by re-crystallization.

d. Distil the purified **acetate of soda** with **sulphuric acid** and **water**. If the product contains sulphurous acid, it must be re-distilled with **bichromate of potash** or **black oxide of manganese**, when the SO_2 is converted into H_2SO_4 .

2. *Acidum Aceticum Glaciale*.—Carefully heat **acetate of soda**, to drive off its water of crystallization; and distil this anhydrous acetate with **sulphuric acid**. Should the product contain SO_2 , it must be treated as indicated under acetic acid.



3. *Acidum Aceticum Dilutum*.

Mix { **Acetic acid**, 1
 Water, 7

4. *Acetum—Vinegar*.—An acid liquid prepared from malt and unmalted grain, by acetous fermentation. The fermenting liquor is allowed to trickle slowly through wood-shavings contained in tall vats, which have small side holes near the bottom, through which the air circulates, and thus a large surface is exposed to its action. The process is one of oxidation of alcohol by the oxygen of the air, thus:— $\text{C}_2\text{H}_6\text{O} + \text{O}_2 = \text{C}_2\text{H}_4\text{O}_2 + \text{H}_2\text{O}$.

CHARACTERS AND PROPERTIES.—1. All this group are clear and colourless liquids, except vinegar, which is brown. Glacial acetic acid forms prismatic crystals at 34° F., and remains crystallized at 48° .

2. Have a more or less pungent acetous odour, according to their strength.

3. Various degrees of acid taste and reaction.

4. The glacial acid is corrosive to organic substances.

5.	Sp. gr.	Neutralizing power. Volumetric solution of soda.
<i>Acetic</i>	1.044	182 grains = 1000 grain-measures.
<i>Glacial</i>	1.065-6	60 grains = 990 grain-measures.
<i>Dilute</i>	1.006	440 grains or 1 fluid ounce = 313 grain-measures.
<i>Vinegar</i>	1.017-9	445.4 grains or 1 fluid ounce = at least 402 grain-measures.

The relative strengths of the three forms of acetic acid in the B.P. are

{	Glacial . . . 1
	Acetic . . . 3
	Dilute, nearly 24

6. The glacial acid dissolves camphor, gum, resin, and volatile oil.

IMPURITIES.—1. In the different forms of acetic acid the chief impurities liable to be present are sulphurous, sulphuric, and hydrochloric acids; and metals.

2. Vinegar is allowed by law to have $\frac{1}{1000}$ th part of sulphuric acid added, in order to preserve it; beyond this amount it is an adulteration. Metals are also liable to be present.

PHARMACY.—1. *Acetic acid* is used in making

some of the officinal acetates; and is contained in the following preparations:—

Acetum cantharidis.
 Extractum colchici aceticum.
 Linimentum terebinthinæ aceticum.
 Liquor ammoniæ acetatis.
 Liquor epispasticus.
 Oxymel.

2. *Dilute acetic acid* is contained in:—

Acetum scillæ.
 Liquor morphiæ acetatis.

3. *Glacial acetic acid* is contained in:—

Acetum cantharides.
 Mistura creasoti.

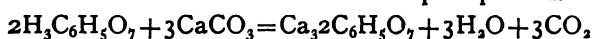
ACTION.—Irritant. Vesicant. Refrigerant. Astringent. Glacial acid is Escharotic.

B. CITRIC ACID. $\text{H}_3\text{C}_6\text{H}_5\text{O}_7$, H_2O .

SOURCE AND PREPARATION.—From lemon- or lime-juice, by the following process:—

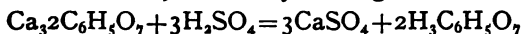
1. Boil the juice, to coagulate the albuminous constituents.

2. Add **prepared chalk** gradually, until effervescence ceases. Citrate of lime is precipitated.



3. Collect the precipitate on a filter, and wash with *hot* water until it is colourless, to remove sugar and malate of lime.

4. Decompose by boiling gently with **sulphuric acid** and **water**, constantly stirring.



5. Separate the solution of citric acid from the precipitated calcium sulphate by filtration; wash the precipitate with distilled water, and add the washings to the solution; concentrate by evaporation, and set aside to crystallize; purify by re-crystallization.

CHARACTERS AND PROPERTIES :—

1. Crystalline, primary form = right rhombic prism.

2. Transparent and colourless.

3. Pleasant, acid taste.

4. Soluble in $\frac{3}{4}$ th its weight of cold water, $\frac{1}{2}$ its weight of boiling water, in rectified spirit (10 in 15) and in glycerine (1 in 2); not in ether. The aqueous solution decomposes on keeping into acetic and carbonic acids, and becomes mouldy.

5. Decomposed by heat, aconitic acid and a little charred matter being left, but disappears completely when burnt with free access of air. Readily oxidized by nitric acid.

IMPURITIES.—Fixed impurities; tartaric acid; oxalic acid; and sulphuric acid.

QUANTITATIVE TEST=POWER OF NEUTRALIZATION.—

A solution of citric acid in distilled water in the proportion of 1 to 14, corresponds to lemon-juice, which is about 35 grains in $\frac{3}{4}$ l.

a. 70 grains dissolved in water=1000 grain-measures of *Vol. solution of soda*.

b. For practical purposes it is well to know the neutralizing power of citric acid with regard to certain officinal salts, thus:—

17 grains of citric acid = fl. $\frac{3}{4}$ ss of lemon-juice. }	neutralize about	{	24 $\frac{1}{4}$ gr.	Bicarbonate of potash.
			20 „	Carbonate of potash.
			20 $\frac{1}{2}$ „	Bicarbonate of soda.
			34 $\frac{3}{4}$ „	Carbonate of soda.
			14 $\frac{1}{4}$ „	Carbonate of ammonia.
			11 $\frac{3}{4}$ „	Carbonate of magnesia.

PHARMACY.—1. Citric acid is necessarily present in *Succus Limonis*, and in *Syrupus Limonis*, which contains lemon-juice.

2. It is employed in the preparation of all the *officinal citrates* or their solutions.

3. It is an ingredient in *Vinum Quiniae*, where it aids materially in dissolving the quinine.

4. Citric acid is much employed in making effervescent draughts.

5. *Incompatibles*.—Tartrate of potash, alkaline carbonates, acetates, and sulphurets.

ACTION.—Refrigerant.

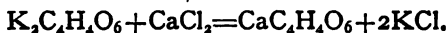
C. TARTARIC ACID. $\text{H}_2\text{C}_4\text{H}_4\text{O}_6$

SOURCE AND PREPARATION.—From bitartrate of potash, by essentially a similar process to that by which citric acid is prepared, but with difference of detail.

1. Boil **cream of tartar** with water, and gradually add **prepared chalk**, constantly stirring. Tartrate of lime and neutral tartrate of potash are formed.

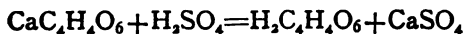


2. When effervescence has ceased, add solution of **chloride of calcium**, to convert the tartrate of potash into tartrate of lime.



3. Separate the tartrate of lime, and wash with distilled water until it is tasteless.

4 Decompose by boiling with **diluted sulphuric acid**, constantly stirring.



5. Filter; evaporate the solution to crystallization; purify by re-crystallization.

CHARACTERS AND PROPERTIES:—

1. Crystalline=oblique rhombic prisms.
2. Colourless and transparent.
3. Strongly acid taste.
4. Soluble in water (10 in 8); in rectified spirit (1 in 5). The aqueous solution becomes mouldy on keeping, and acetic acid is formed.
6. Modified by heat, and burns away with free access of air.

IMPURITIES.—Lime; metals; oxalic acid.

QUANTITATIVE TEST=POWER OF NEUTRALIZATION.

- a. 75 grains dissolved in water=1000 grain-measures of *Vol. solution of soda*.
- b. 100 grains = 133 grains of bicarbonate of potash.

PHARMACY.—1. Tartaric acid is not directly employed in any pharmaceutical preparation, but it is contained in the alkaline tartrates, tartarated antimony, and tartarated iron.

2. It was formerly much employed in making effervescent draughts, but its place is now taken by citric acid.

3. *Incompatibles*.—Salts of potash, lime, mercury, and lead; vegetable astringents.

4. In the appendix there is a test-solution of tartaric acid { Tartaric acid, 1.
Distilled water, 8.
Rectified spirit, 2.

ACTION.—Refrigerant.

AMMONIUM.

GENERAL SUMMARY.—The preparations of ammonia may be arranged according to the following plan :—

- A. **Solutions of Gaseous Ammonia = NH_3 in Water.**
1. *Liquor ammoniæ fortior.*—Stronger solution of ammonia = 32.5 per cent. of NH_3 , or 15.83 grains in fl. 3 i.
 2. *Liquor ammoniæ*—Solution of ammonia = 10 per cent. of NH_3 , or 5.2 grains in fl. 3 i.
- B. **Solutions of Salts in Water.**
1. *Liquor ammoniæ acetatis*—“Mindererus’ spirit.”—Solution of acetate of ammonia = $\text{NH}_4\text{C}_2\text{H}_3\text{O}_2$.
 2. *Liquor ammoniæ citratis.*—Solution of citrate of ammonia = $3\text{NH}_4\text{C}_6\text{H}_5\text{O}_7$.
 3. *Liquor bismuthi et ammoniæ citratis.*—A solution of citrate of ammonia and bismuth, with some nitrate of ammonia. See BISMUTH.
- C. **Salts.**
1. *Ammoniæ benzoas*— $\text{NH}_4\text{C}_7\text{H}_5\text{O}_2$.
 2. *Ammoniæ carbonas.*—A mixture of acid ammonic carbonate, with ammonic carbamate— $2\text{NH}_4\text{HCO}_3, (\text{NH}_3)_2\text{CO}_2$.
 3. *Ammoniæ nitras*— NH_4NO_3 .
 4. *Ammoniæ phosphas*— $(\text{NH}_4)_2\text{HPO}_4$.
 5. *Ammonii bromidum*— NH_4Br .
 6. *Ammonii chloridum*—*Sal ammoniac* = NH_4Cl .

D. Special Official Preparations.

1. *Linimentum ammoniæ.*
2. *Spiritus ammoniæ aromaticus—Sal volatile.*—A spirituous solution of ammonia, neutral carbonate of ammonia, and oils of nutmeg and lemon.
3. *Spiritus ammoniæ fetidus.*—A spirituous solution of ammonia with oil of assafoetida.

E. Test-Solutions in Appendix.

1. *Carbonate*, $\frac{3}{4}$ ad $\frac{3}{4}$ 10.
2. *Chloride*, $\frac{3}{4}$ ad $\frac{3}{4}$ 10.
3. *Oxalate*, $\frac{3}{4}$ ad $\frac{3}{4}$ 20.
4. *Sulphide*, made with solution of ammonia and H_2S .
5. Solution of ammonia is also contained in:—
Solution of ammonio-nitrate of silver.
Solution of ammonio-sulphate of copper.
Solution of ammonio-sulphate of magnesia, with chloride of ammonium.

SOURCE AND PREPARATION.—The following table will indicate from what sources the compounds of ammonia are severally derived.

The groups of *official preparations* and *test-solutions* are omitted.

1. From *Ammoniacal liquor*, a waste product of the manufacture of gas. } Ammonii chloridum.

2. From *Ammonium Chloride*. { *a.* Liquor ammoniæ fortior.
 b. Ammoniæ carbonas.
3. From *Liquor Ammonia Fortior*. { *a.* Liquor ammoniæ.
 b. Liquor ammoniæ citratis.
 c. Ammoniæ phosphas.
4. From *Liquor Ammonia*. { *a.* Liquor bismuthi et ammoniæ citratis.
 b. Ammoniæ benzoas.
 c. Ammonii bromidum.
5. From *Carbonate of Ammonia*. { *a.* Liquor ammoniæ acetatis.
 b. Ammoniæ nitras.

The actual preparation of these compounds can be more easily remembered according to another plan, as follows:—

A. Salts.

1. *Chloride*.—This is the preparation of ammonia first obtained, and it is the ultimate source of all the rest.

a. Neutralize the **ammoniacal liquor** of gas-works with **hydrochloric acid**; a tarry solution of ammonium chloride is formed, CO_2 and H_2S being given off.



b. Evaporate, crystallize, and purify by sublimation. It forms hemispherical cakes, which are broken into pieces. For medicinal use it should be re-crystallized.

2. *Carbonate*.—Mix **ammonium chloride** with **chalk**, heat, and condense what is volatilized.



The remaining salts are made by neutralizing the respective acids, and evaporating, thus:—

Neutralized by

- | | |
|------------------------|--------------------------------|
| 3. <i>Benzoate</i> | } Liquor ammoniæ. |
| 4. <i>Bromide</i> | |
| 5. <i>Nitrate</i> .— | Carbonate of ammonia. |
| 6. <i>Phosphate</i> .— | Liquor ammoniæ fortior. |

The following are the special points to be noted as to the preparation of each of these salts.

Benzoate.—Dissolve **benzoic acid** in slight excess of **solution of ammonia**, and evaporate slowly.

Bromide.—Saturate **hydrobromic acid** with **solution of ammonia**, and evaporate.

Nitrate.—Saturate **dilute nitric acid** with **carbonate of ammonia**, evaporate to dryness, and fuse the residue.

Phosphate.—*a.* Add **dilute phosphoric acid** to the **stronger solution of ammonia**, until it remains slightly alkaline.

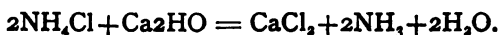
b. Evaporate, adding more ammonia from time to time, to prevent formation of acid phosphate.

c. Dry the crystals quickly on filtering paper on a porous tile.

B. Solutions.

1. *Liquor Ammoniæ Fortior.*

- a.* Heat { **Ammonium chloride**
Slaked lime.



b. Pass the liberated gas (NH_3) into water, to saturation, under pressure.

2. *Liquor Ammonia.*

Mix { **Liquor ammonia fortior**, 1
Water, 2

3. *Liquor Ammonia Acetatis.*

a. Add gradually powdered **carbonate of ammonia** ($\frac{3}{4}$ 3½) to **acetic acid**, ($\frac{3}{4}$ 10) until a neutral solution is formed.

b. Dilute with water = 0 2½

4. *Liquor Ammonia Citratis.*

a. Dissolve { **Citric acid**, $\frac{3}{4}$ 3
Water, 0 1.

b. Add **strong solution of ammonia** to neutralization.

5. *Liquor Bismuthi et Ammonia Citratis.*—(See BISMUTH).

CHARACTERS AND PROPERTIES.—These may also be conveniently considered under the two divisions of:—A. **Salts**; B. **Solutions**.

A. Salts.

The salts of ammonia have the following properties in common:—

1. White or colourless; and crystalline.
2. Neutral in reaction, except the *carbonate*, which is alkaline.
3. Volatilized and sublimed by heat, except the *nitrate*, which first fuses, and is then decomposed into nitrous oxide gas (N_2O) and H_2O . This salt is introduced into the B.P. to make N_2O .

The other properties may be arranged in a tabular form:—

	CRYSTALS.	SOLUBILITY.	ODOUR AND TASTE.	CHANGES.
1. <i>Benzoate.</i>	Laminar. Colourless.	Water = 1 in 5. Rectified spirit = 1 in 18.	Balsamic odour.	None.
2. <i>Carbonate.</i>	Crystalline masses. Translucent.	Water = 1 in 4. Sparingly in spirit. Glycerine = 1 in 5. Boiling water dissolves but decomposes it. Freely soluble in acids, with effervescence.	Strongly ammoniacal and pungent odour; acid taste.	On exposure to air, loses its odour; a white opaque powder forms = acid carbonate.
3. <i>Nitrate.</i>	Confused crystalline masses.	Water = 4 in 3. Spirit = 1 in 17.	Bitter and acid taste.	Deliquescent.
4. <i>Phosphate.</i>	Large prisma. Transparent.	Water = 1 in 2. Insoluble in rectified spirit.	No odour.	On exposure to air, loses water and ammonia, and effloresces, becoming opaque.
5. <i>Bromide.</i>	Small crystals.	Water = 1 in 18. Rectified spirit = 1 in 13.	No odour. Pungent, saline, disagreeable taste.	Liable to decompose, and to become slightly yellowish.
6. <i>Chloride.</i>	Fibrous masses; translucent; tough, and difficult to powder.	Water = 1 in 3. Rectified spirit = 1 in 55. Glycerine = 1 in 5.	Odourless. Strong, pungent, and saline taste.	None.

upon a filter with solution of ammonia, diluted with an equal volume of water, dried, and heated to redness, leaves 16.8 grains = *pyro-phosphate of magnesia*.

PHARMACY.—1. *Official preparations* :—

a. *Linimentum Ammonice*.

Mix { Solution of ammonia, 1 } = A semi-solid
Olive oil, 3 } cream.

b. *Spiritus Ammonice Aromaticus*.

Carbonate of ammonia, 3 8	} Distil to 7 pints. Colourless. Sp. gr. = .870
Strong solution of ammonia, 3 4	
Volatile oil of nutmeg, 3 4	
Oil of lemon, 3 6	
Rectified spirit, 0 6	
Water, 0 3.	

Dose = m 20 to 30.

c. *Spiritus Ammonice Fœtidus*.

Macerate for 24 hours { Assafoetida, 1 ½
and distil { Rectified spirit, 15

Add strong solution of ammonia = 2 to the distillate, and make up with spirit to 20.

Colourless, but becomes yellow by keeping.

Dose = 3 ½ to 3 1.

2. The other preparations in which ammonia or its compounds are contained, include :—

a. *Liquor Ammonie Fortior*. { (i.) Linimentum Camphoræ
Compositum.
(ii.) Tinctura Opii Ammoniata.

b. *Liquor Ammonie*—Tinctura Quiniæ Ammoniata.

c. Spiritus Ammoniaë Aromaticus. { (i.) Tinctura Guaiaci Ammoniata.
(ii.) Tinctura Valerianæ Ammoniata.

d. Ammonii Chloridum. { Liquor Hydrargyri Perchloridi, to aid solution.

3. *Incompatibles.*—The chief incompatibles to be mentioned in relation to the preparations of ammonia are as follows:—

a. Carbonate.—Acids and acidulous salts; earthy salts; lime-water.

b. Benzoate.—Acids; persalts of iron; liquor potassæ.

c. Bromide.—Acids and acidulous salts; spirit of nitrous ether.

d. Chloride.—Alkalies, alkaline earths, and their carbonates; lead and silver salts.

e. Liquor ammonia acetatis.—Acids; alkalies and their carbonates; lime-water; lead and silver salts.

ACTION.—The actions of the different preparations of ammonia may be thus summarized:—

1. *Solutions of Ammonia.*—According to strength may be external escharotic, vesicant, rubefacient, or stimulant. Local antidote to poison of wasps, spiders, etc. Internally, well-diluted, antacid, and absorbs gas in stomach. Diffusible stimulant, (also by inhalation through nostrils; and injection into a vein in extreme cases). Antispasmodic. *Dose.*—m 10 to 20 of *Liquor ammoniaë*.

2. *Carbonate.*—Stimulant by inhalation through nostrils, as “smelling-salts.” Internally, antacid in stomach; antispasmodic; diffusible stimulant; stimulant expectorant; diaphoretic; emetic. *Dose.* gr. 3 to 10 usually; emetic, gr. 20 to 30.

3. { *Spiritus Ammoniaë Aromaticus* } Stimulant. Anti-
 { *Spiritus Ammoniaë Fœtidus* } spasmodic.
4. { *Liquor Ammoniaë Acetatis* } Diaphoretic. Diure-
 { *Liquor Ammoniaë Citratis* } tic. Refrigerant.
 Dose.—3 2 to 6.
5. *Benzoate*.—Diuretic, and makes urine more acid. Hepatic stimulant. Dose.—gr. 10 to 20.
6. *Bromide*.—Sedative. Soporific. Deadens laryngeal sensibility. Dose.—gr. 5 to 20.
7. *Chloride*.—Expectorant. Diaphoretic. Diuretic. Alterative. Cholagogue. Emmenagogue. Antineuralgic. External stimulant and resolvent. Dose.—gr. 5 to 20 or 30.
8. *Phosphate*.—Diaphoretic. Hepatic stimulant. Dose.—gr. 5 to 20.

POTASSIUM.

GENERAL SUMMARY.—The preparations of potassium recognised in the B.P. are very numerous, but the following classification may help in remembering them.

1. Forms of Potash.

- a. *Potassa Caustica*—Caustic potash, or Potassic Hydrate = KHO .
- b. *Liquor Potassæ*. A solution of Potassic Hydrate = 5·84 per cent., or 27 grains in fl. $\frac{3}{4}$ i.

2. Inorganic Salts.

- a. *Potassæ Carbonas*—Carbonate of potash = K_2CO_3 , with about 16 per cent. of water of crystallization.
- b. „ *Bicarbonas*—Bicarbonate of Potash = KHCO_3 .
- c. „ *Bichromas*—Bichromate of Potash = $\text{K}_2\text{Cr}_2\text{O}_7$.
- d. „ *Chloras*—Chlorate = KClO_3 .
- e. „ *Nitras*—Nitrate of Potash, Nitre, or Saltpetre = KNO_3 .
- f. „ *Permanganas*—Permanganate of Potash = KMnO_4 .
- g. „ *Prussias Flava*—Yellow prussiate—Ferrocyanide of Potassium = $\text{K}_4\text{FeC}_6\text{N}_6, 3\text{H}_2\text{O}$.
- h. „ *Sulphas*—Sulphate = K_2SO_4 .
- i. *Potassii Bromidum*—Bromide of Potassium = KBr .
- j. „ *Iodidum*—Iodide of Potassium = KI .
- k. *Potassa Sulphurata*—Hepar Sulphuris—Liver of Sulphur (see SULPHUR).

3. **Organic Salts.** {
- a. *Potassæ Acetas*—Acetate of Potash = $\text{KC}_2\text{H}_3\text{O}_2$.
 - b. „ *Citras*—Citrate of Potash = $\text{K}_3\text{C}_6\text{H}_5\text{O}_7$.
 - c. „ *Tartras*—Tartrate—Soluble Tartar = $\text{K}_2\text{C}_4\text{H}_4\text{O}_6$.
 - d. „ *Tartras Acida*—Acid Tartrate—Cream of Tartar = $\text{KHC}_4\text{H}_4\text{O}_6$.
 - e. *Soda Tartarata* = Tartrate of Soda and Potash. (See SODIUM).
4. **Special solutions.** {
- a. *Liquor Potassæ Effervescens*—Potash Water.
 - b. *Liquor Arsenicalis* (see ARSENIC).
 - c. *Liquor Potassæ Permanganatis*—Solution of Permanganate of potash. Condyl's fluid.
5. **Soap . . .** *Sapo Mollis*—Soft Soap.
6. **Special Official Preparations.** {
- a. *Linimentum Potassii Iodidi cum Sapone*.
 - b. *Unguentum Potassii Iodidi*.
 - c. *Trochisci Potassæ Chloratis*.
 - d. *Unguentum Potassæ Sulphuratæ*.
7. **Test-Solutions in Appendix.** {
- a. Solution of Acetate of Potash, $\frac{3}{3}$ ss to $\frac{3}{3}$ 5.
 - b. „ Iodide of Potassium, $\frac{3}{3}$ 1 to $\frac{3}{3}$ 10.
 - c. „ Iodate of Potash.
 - d. „ Red Prussiate of Potash, $\frac{3}{3}$ $\frac{1}{4}$ to $\frac{3}{3}$ 5.
 - e. „ Yellow Prussiate of Potash, $\frac{3}{3}$ $\frac{1}{4}$ to $\frac{3}{3}$ 5.
 - f. Volumetric solution of Bichromate of Potash = 14.75 grains in 1000 grain-measures.

SOURCES AND PREPARATION.—The sources of the officinal potassium-compounds may be sketched as follows :—

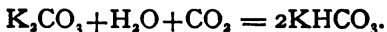
- | | | |
|---|---|---|
| 1. <i>Native</i> , or
artificially pro-
duced during
certain proces-
ses. | { | <i>a. Carbonate</i> — <i>Pearl-ash</i> , from lixivi-
ated wood-ashes.
<i>b. Nitrate</i> , from nitre-soils in India.
<i>c. Acid Tartrate</i> , from argol—red
or crude tartar, a deposit in
wine-casks. |
| 2. From
<i>Carbonate</i> | { | <i>a. Liquor Potassæ.</i>
<i>b. Potassæ Acetas.</i>
<i>c. „ Bichromas.</i>
<i>d. „ Carbonas.</i>
<i>e. „ Chloras.</i>
<i>f. „ Citras.</i>
<i>g. „ Prussias Flava.</i>
<i>h. Potassa Sulphurata.</i>
<i>i. Liquor Arsenicalis.</i> |
| 3. From <i>Liquor</i>
<i>Potassæ.</i> | { | <i>a. Potassa Caustica.</i>
<i>b. Potassii Bromidum.</i>
<i>c. „ Iodidum.</i> |
| 4. From <i>Bicarbonate</i> — <i>Liquor Potassæ Effervescens.</i> | | |
| 5. From <i>Nitrate</i> and <i>Carbonate</i> — <i>Potassæ Sulphas.</i> | | |
| 6. From <i>Bitartrate</i> — <i>Soda Tartarata.</i> | | |
| 7. From <i>Carbonate</i> and <i>Bitartrate</i> — <i>Potassæ Tartras.</i> | | |
| 8. From <i>Caustic Potash</i>
and <i>Chlorate</i> | } | <i>Potassæ Permanganas.</i> |

The actual modes of making those preparations of potassium, which it is necessary to consider here, will now be pointed out, according to the following plan :—

A. CARBONATES.

1. *Carbonate*—**Pearl-ash** or lixiviated wood-ash is treated with its own weight of **water**, while briskly agitating, and the solution is evaporated to dryness.

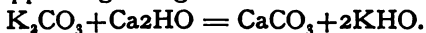
2. *Bicarbonate.* Pass **carbonic acid gas** through a strong solution of **carbonate of potash** for a week.



Crystals are gradually deposited, which are washed, drained, and dried on filtering paper by exposure to air. More crystals are yielded by concentration.

B. FORMS OF POTASH.

1. *Liquor Potassæ.*—By the action of **slaked lime** on solution of **carbonate of potash**. Decant or draw off by means of a syphon, and keep in well-stoppered green-glass bottles.



2. *Potassa Caustica.* Boil **liquor potassæ** in a silver or clean iron vessel, until it becomes of oily consistence, and a drop on a warm glass rod solidifies on cooling. Pour into moulds; and when solid and still warm put into stoppered bottles.

C. INORGANIC SALTS PREPARED FROM CARBONATE.

1. *Bichromate.*—Roast **chrome iron ore** with a mixture of **carbonate of potash** and **chalk** in a furnace through which a current of air passes. Yellow chromate is formed, which is treated with **sulphuric acid**, when the bichromate or red chromate is produced.

2. *Chlorate.*—a. Pass **chlorine gas** into a mixture of excess of **slaked lime** and **carbonate of potash**, triturated with water, so as to be slightly moist.

b. Boil with water for twenty minutes, filter, and evaporate until a film forms on the surface; set aside to cool and crystallize; purify by dissolving in boiling distilled water, and re-crystallization.



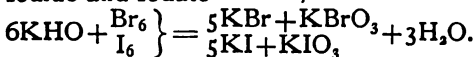
3. *Yellow Prussiate*.—Fuse horns, hoofs, etc. with **carbonate of potash**, in an iron pot; lixivate in water; and crystallize.

D. SALTS PREPARED FROM LIQUOR POTASSÆ.

1. *Bromide*. } These salts are prepared on the
2. *Iodide*. } same plan, namely:—

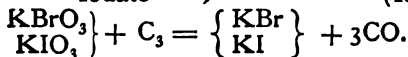
a. Add { **Bromine**
 Iodine } respectively to **Liquor potassæ**, with constant agitation, until a permanent brown tint is observed.

Bromide and Bromate, }
Iodide and Iodate } are formed:—



b. Evaporate to dryness; powder finely; and mix intimately with powdered **wood-charcoal**.

c. Melt in a red-hot iron crucible, and then pour out contents. $\left. \begin{matrix} \text{Bromate} \\ \text{Iodate} \end{matrix} \right\}$ converted into $\left\{ \begin{matrix} \text{Bromide} \\ \text{Iodide} \end{matrix} \right.$.



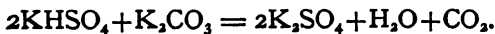
d. When cool, dissolve in water, filter, crystallize, drain, dry, and evaporate for more crystals.

E. SPECIAL INORGANIC SALTS.

1. *Nitrate*.—Treat **nitre-soils**, containing nitrate of potash mixed with nitrate of lime, with **wood-ashes** or **carbonate of potash**, and dissolve out the soluble nitrate of potash. Crystallize, and purify by re-solution and re-crystallization.

2. *Sulphate*.—a. Dissolve in water the residuum left after the action of sulphuric acid on nitre, in making nitric acid = **acid sulphate of potash**.

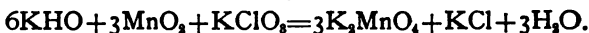
b. Neutralize with **carbonate of potash**, and crystallize.



3. *Permanganate*. By a complicated process:—

a. Mix { **Chlorate of potash**, powdered, $\frac{3}{4}$ $\frac{3}{4}$ } ;
 { **Black oxide of manganese**, $\frac{3}{4}$ } ;
 add { **Caustic potash**, $\frac{3}{4}$ }
 { **Water**, $\frac{3}{4}$ } to these in a porcelain vessel; and evaporate to dryness in a sand-bath, stirring diligently.

b. Powder the mass; put into a covered crucible, and expose to a dull-red heat for an hour, or until semi-fused. *Manganate of potash* is formed.



c. Cool; powder; boil with $\text{O} \frac{1}{2}$ water; decant; boil again with $\text{O} \frac{1}{2}$ of water; decant again; mix the liquors, and neutralize accurately with **dilute sulphuric acid**. *Permanganate* is thus formed.

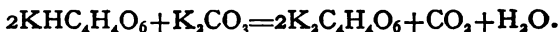


d. Evaporate; crystallize; drain, and purify the crystals by re-solution, straining through asbestos, re-crystallization, draining, and drying over sulphuric acid.

F. ORGANIC SALTS.

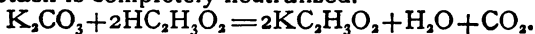
1. *Acid Tartrate*.—Purify **argol**, by means of **charcoal** and **clay**, from tartrate of lime and colouring matter. Dissolve, and re-crystallize by evaporation. The purest crystals are skimmed off the surface during evaporation, hence called *cream of tartar*.

2. *Tartrate*.—a. Gradually add **acid tartrate** to a boiling solution of **carbonate of potash**, and boil for a few minutes. The liquid must be quite neutral.



b. Filter; crystallize by concentration and evaporation; drain, and dry the crystals by exposure to air in a warm place.

3. *Acetate*.—*a*. Add **carbonate of potash** gradually to excess of **acetic acid**, so that the potash is completely neutralized.



b. Filter; acidulate if necessary; evaporate to dryness; liquefy cautiously; allow to cool and solidify; when still warm break into fragments, and put into stoppered bottles.

4. *Citrate*. *a*. Neutralize a solution of **citric acid** with **carbonate of potash**.

b. Filter; evaporate to dryness, stirring constantly after a pellicle has begun to form, till the salt granulates.

c. Triturate in a dry warm mortar; and preserve in stoppered vessels.

CHARACTERS AND PROPERTIES.—The properties of the preparations of potassium not alluded to elsewhere, may be described under the following groups:—

1. **Caustic Potash.**

- a*. In hard moulds or sticks = size of pencil.
- b*. White colour and opaque; often coloured.
- c*. Very deliquescent.
- d*. Very soluble in water (2 in 1) and alcohol.
- e*. Powerfully alkaline.
- f*. Corrosive; dissolves animal tissues.
- g*. Melts below red heat to an oily liquid.

2. **Liquor Potassæ.**

- a*. A colourless liquid; sp. gr. = 1.058.
- b*. Strongly alkaline reaction.
- c*. Intensely acrid and caustic taste.
- d*. Readily attracts CO_2 from the air; and dissolves lead from white glass bottles.

3. **White or Colourless Salts.**—These are all *crystalline*, but the *carbonate*, *citrate*, *tartrate*, and often the *acid tartrate* are in a powdery or granular form, the crystals being very small. They are inodorous. Their prominent characters may be arranged in a tabular form:—

	CRYSTALS.	REACTION.
1. <i>Acetate.</i>	Foliaceous and satiny masses.	Neutral.
2. <i>Bicarbonate.</i>	Right rhombic prisms. Large ; transparent.	Neutral.
3. <i>Carbonate.</i>	Powdery=grains; white and rather opaque.	Alkaline, and somewhat caustic.
4. <i>Chlorate.</i>	Rhomboidal plates or tabular crystals = 4- or 6-sided; transparent.	Neutral.
5. <i>Citrate.</i>	Crystalline powder.	Neutral.
6. <i>Nitrate.</i>	Six-sided prisms ; striated. In masses or fragments ; white and opaque.	Neutral.
7. <i>Sulphate.</i>	Six-sided prisms, ending in six-sided pyramids. Transparent ; very hard.	Solution should be neutral.
8. <i>Tartrate.</i>	Small ; 4- or 6-sided prisms ; colourless.	Neutral.
9. <i>Acid Tartrate.</i>	Finely gritty white powder ; or fragments of cakes, crystallized on one surface.	Acid.
10. <i>Bromide.</i>	Cubical ; colourless ; semi-transparent.	Neutral.
11. <i>Iodide.</i>	Cubical. Opaque.	Solution should be neutral, but generally alkaline.

TASTE.	SOLUBILITY.	CHANGES.
Saline.	Very soluble in water (3 in 1), and alcohol.	Very deliquescent.
Saline, and feebly alkaline.	Cold water (1 in 3). Boiling water (1 in 1). Insoluble in alcohol.	Not deliquescent. When heated, carbonate is left.
Strongly alkaline, and caustic.	Readily in water (1 in $\frac{1}{2}$). Insoluble in alcohol.	Very deliquescent. Loses 16 per cent. of weight with red heat.
Cool, and saline.	Cold water (1 in 16). Boiling water (1 in 2).	Liquefies with heat; gives off O, and KCl remains.
Feebly acid, and saline.	Water (10 in 6). Glycerine (1 in 2). Insoluble in proof spirit.	Deliquescent.
Eccentric; cooling and saline.	Cold water (1 in 4). Boiling water (1 in $2\frac{1}{2}$). Sparingly in alcohol.	Melts with heat, and is cast into moulds= <i>Sal prunella</i> . Heated to redness, gives off O, and is changed into nitrite.
Bitter and saline.	Cold water (1 in 10). Boiling water (1 in 4). Insoluble in alcohol.	Not deliquescent. Decrepitates strongly when heated.
Bitterly saline, and bitterish.	Water (10 in 8)= <i>Soluble tartar</i> . Insoluble in alcohol.	Somewhat deliquescent. Decomposed by heat.
Pleasant, acid.	Cold water (1 in 200). Boiling water (1 in 16). Insoluble in alcohol.	Heat evolves an odour of burnt sugar; a black residue remains.
Pungent, and saline.	Water (1 in 2). Rectified spirit (1 in 90).	Somewhat liable to decomposition.
Saline, acrid, and bitterish.	Water (4 in 3). Rectified spirit (1 in 16).	Very liable to decompose, becoming yellowish, and evolving odour of iodine.

4. Coloured Crystalline Salts.

Excluding *Potassa Sulphurata* (see SULPHUR), the only coloured salts of potash recognised in the body of the B. P. are as follows :—

	CRYSTALS.	ODOUR AND TASTE.	SOLUBILITY.	CHANGES.
1. <i>Bichromate.</i>	Large; red; four-sided; transparent.		Water (1 in 10).	Fuses and decomposes by heat.
2. <i>Permanganate.</i>	Slender; prismatic; dark purple.	No odour. Sweetish and astringent taste.	Water (1 in 16). Solution has a rich purple colour.	Powerful oxidiser. When heated, O is evolved, and black residue remains.
3. <i>Yellow Prussiate.</i>	Large; yellow.		Water (1 in 4). Insoluble in alcohol.	

In the *Appendix* the *Red prussiate* is mentioned, which is in garnet-red crystals, forming a green solution in water.

IMPURITIES.—The chief of these are as follows :—

a. Liquor Potassæ.—CO₂, lime, sulphates, chlorides, and alumina.

b. Acetate.—Metallic impurities.

c. Carbonate.—Traces of silica, sulphate, and chloride are usually present.

d. Chlorate.—Chlorine, chloride, lime.

e. Nitrate.—Sulphates and chlorides.

f. Sulphate.—Lime.

g. Bromide.—Iodide.

h. Iodide.—Iodate, chlorine, and carbonates.

QUANTITATIVE TESTS.—These may be divided into two groups, namely :—

1. **Power of Neutralization.**

2. **Special Tests.**

- d. *Unguentum Potassii Iodidi*—White. $\left\{ \begin{array}{l} \text{Iodide of potassium, gr. 64} \\ \text{Carbonate of potash, gr. 4} \\ \text{Water, 3 i} \\ \text{Prepared lard, 3 i} \end{array} \right\} \begin{array}{l} \text{Dissolve} \\ \text{and mix} \\ \text{tho-} \\ \text{roughly} \\ \text{with} \end{array}$

The carbonate is introduced to prevent the ointment from turning yellow.

- e. *Trochisci Potassæ Chloratis* = gr. 5 in each, made in the ordinary way with $\left\{ \begin{array}{l} \text{Refined sugar.} \\ \text{Gum arabic.} \\ \text{Mucilage.} \\ \text{Water.} \end{array} \right.$

2. The other preparations in which the compounds of potassium are contained, or in making which they are used, are as follows:—

- a. *Bichromate*.—Used in making *valerianate of soda*.
b. *Yellow prussiate*.—Used in making *dilute hydrocyanic acid*.

- c. *Iodide* contained in $\left\{ \begin{array}{l} \text{(i) } \textit{Linimentum Iodi.} \\ \text{(ii) } \textit{Liquor Iodi.} \\ \text{(iii) } \textit{Tinctura Iodi.} \\ \text{(iv) } \textit{Unguentum Iodi.} \end{array} \right.$
- d. *Carbonate* contained in $\left\{ \begin{array}{l} \text{(i) } \textit{Decoctum Aloes Compositum.} \\ \text{(ii) } \textit{Enema Aloes.} \\ \text{(iii) } \textit{Liquor Arsenicalis.} \\ \text{(iv) } \textit{Mistura Ferri Composita.} \end{array} \right.$
- e. *Sulphate* contained in $\left\{ \begin{array}{l} \text{(i) } \textit{Pilula Colocynthis Composita.} \\ \text{(ii) } \textit{Pilula Colocynthis et Hyoscyami.} \\ \text{(iii) } \textit{Pulvis Ipecacuanhæ Compositus.} \end{array} \right.$
- f. *Acid Tartrate*, an important ingredient in $\left\{ \begin{array}{l} \text{(i) } \textit{Confectio Sulphuris.} \\ \text{(ii) } \textit{Pulvis Jalapæ Compositus.} \end{array} \right.$

Also used in preparing *Antimonium tartaratum* and other preparations.

3. *Incompatibles*.—The incompatibles requiring special notice are as follows:—

a. Liquor Potassæ.—Acids, acidulous salts; preparations of ammonia; metallic salts; preparations of belladonna, stramonium, and hyoscyamus.

b. Bromide.—Acids, acidulous salts; metallic salts.

c. Iodide.—Acid preparations; spirit of nitre; vegetable preparations containing starch; decoction of liquorice.

ACTION.—The action of the different compounds of potassium may be thus stated:—

1. *Caustic Potash*.—Strong caustic or escharotic.

2. *Liquor Potassæ*.—External detergent; milder escharotic; stimulant. Internally, antacid; gastric sedative; diuretic; alterative. *Dose*.— \mathfrak{m} 15 to 60, well-diluted.

3. *Carbonate and Bicarbonate*.—Carbonate is an external detergent. Internally both are antacid; diuretic; alterative; antilithic. Carbonate is rarely given. Potash-water has similar actions, and is a gastric sedative and refrigerant. *Dose*.—*Carbonate*, gr. 5 to 12. *Bicarbonate*, gr. 10 to 60. *Potash-water*, $\frac{3}{5}$ 5 to 10.

4. *Acetate*.—Diuretic. Remote antacid. Purgative. *Dose*.—gr. 10 to 60 or more.

5. *Citrate*.—Refrigerant. Diaphoretic. Remote antacid. Antilithic. Antiscorbutic. *Dose*.—gr. 20 to 60.

6. *Bromide*.—Sedative. Hypnotic. Antispasmodic, Alterative. Anaphrodisiac. Deadens sensibility of larynx. *Dose*.—gr. 5 to 60.

7. *Iodide*.—Alterative. Absorbent. Anti-syphilitic. Diuretic. Emmenagogue. *Dose*.—gr. 2 to 10, 20, or more.

8. *Chlorate*.—Local refrigerant; much used as an application to mouth and throat in diphtheria, aphthæ, etc. Internally, diuretic; refrigerant; stimulant. *Dose*.—gr. 10 to 20; of *Trochisci*, 1 to 6.

9. *Nitrate*.—Refrigerant. Diuretic. Vascular sedative. Diaphoretic. Nitre-paper burnt for asthma. *Dose*.—gr. 5 to 30.

10. *Permanganate*.—Antiseptic. Deodorant. Disinfectant. Emmenagogue. *Dose*.—gr. 1 to 2; of *Liquor*, 3 i to 2.

11. *Sulphate*.—Aperient. *Dose*.—gr. 15 to 60.

12. *Acid Tartrate*.—Refrigerant. Saline and hydragogue purgative. Diuretic. *Dose*.—gr. 20 to $\frac{3}{2}$ or more, according to effects required.

13. *Tartrate*.—Antacid. Purgative. Diuretic. *Dose*.—gr. 20 to $\frac{3}{2}$ i.

SODIUM.

GENERAL SUMMARY.—A similar plan of arrangement may be adopted as in the case of Potassium.

- | | |
|----------------------------|---|
| 1. Forms of Soda. | { <ul style="list-style-type: none"> a. <i>Soda Caustica</i>—<i>Caustic Soda</i> or <i>Sodic Hydrate</i> = NaHO. b. <i>Liquor Sodæ</i>—Solution of Soda = 18·8 grains of <i>Hydrate of Soda</i> in fl. $\frac{3}{4}$ I, or 4 grains in 100. |
| 2. Inorganic Salts. | { <ul style="list-style-type: none"> a. <i>Sodæ Carbonas</i>—Carbonate of Soda = $\text{Na}_2\text{CO}_3, 10\text{H}_2\text{O}$. b. „ <i>Carbonas Exsiccata</i>—Dried Carbonate of Soda = Na_2CO_3. 53 Grains = 143 grains of Carbonate. c. „ <i>Bicarbonas</i> — Bicarbonate of Soda = NaHCO_3. d. „ <i>Arsenias</i> — Arseniate of Soda. (See ARSENIC). e. „ <i>Biboras</i>—Borax = $\text{Na}_2\text{B}_4\text{O}_7, 10\text{H}_2\text{O}$. f. „ <i>Hypophosphis</i>—Hypophosphite of Soda. (See PHOSPHORUS). g. „ <i>Nitras</i>—Nitrate of Soda = NaNO_3. h. „ <i>Phosphas</i> — Phosphate of Soda = $\text{Na}_2\text{HPO}_4, 12\text{H}_2\text{O}$. i. „ <i>Sulphas</i> — Sulphate of Soda, <i>Glauber Salt</i> = $\text{Na}_2\text{SO}_4, 10\text{H}_2\text{O}$. j. <i>Sodii Chloridum</i> — Chloride of Soda—Common Salt = NaCl. |

3. **Organic Salts.** {
- a. *Sodæ Acetas*—Acetate of Soda = $\text{NaC}_2\text{H}_3\text{O}_2, 3\text{H}_2\text{O}$.
 - b. „ *Citro-Tartras Effervescens*—Effervescent Citro-Tartrate of Soda. An agglutination of bicarbonate of soda with citric and tartaric acids, by means of water of crystallization.
 - c. „ *et Potassæ Tartras—Soda Tartarata*—Tartarated Soda, *Rochelle Salt* = $\text{NaKC}_4\text{H}_4\text{O}_6, 4\text{H}_2\text{O}$.
 - d. „ *Valerianas*—Valerianate of Soda = $\text{NaC}_8\text{H}_5\text{O}_2$.
4. **Special Solutions.** {
- a. *Liquor Sodæ Effervescens*—Soda Water.
 - b. *Liquor Sodæ Arseniatis*. (See ARSENIC).
 - c. *Liquor Sodæ Chloratæ*. (See CHLORINE).
5. **Soaps.** {
- a. *Sapo Durus*—Hard Soap.
 - b. *Sapo Animalis*—Curd Soap.
6. **Special Official Preparations.** {
- a. *Trochisci Sodæ Bicarbonatis*, gr. 5 in each.
 - b. *Cataplasma Sodæ Chloratæ*.
 - c. *Glycerinum Boracis*.
 - d. *Mel Boracis*.
7. **Test-Solutions in Appendix.** {
- a. *Solution of Acetate of Soda*, $\frac{3}{3}$ to $\frac{3}{5}$.
 - b. *Solution of Phosphate of Soda*, $\frac{3}{3}$ 1 to $\frac{3}{3}$ 10.
 - c. *Volumetric Solution of Soda*, gr. 40 in 1000 grain-measures.
 - d. *Volumetric Solution of Hyposulphite of Soda*.

SOURCES AND PREPARATION.—Following a similar plan to that adopted in the case of potassium, the sources of the sodium-compounds may be thus indicated:—

1. *Native* {
 - a. Chloride*—Sea-water and certain springs; and solid, as rock-salt.
 - b. Nitrate*—Native in soils in Peru, Chili, and other parts of South America.
 - c. Borax*—Spontaneous deposit by evaporation on the shores of certain lakes in Thibet, and imported from India as “tincal” or “crude borax”; also prepared from boracic acid, obtained from the lagoons in Tuscany.
2. From *Chloride* {
 - Carbonate*—This salt was formerly obtained from “kelp”; and is also found native, as an efflorescence on the borders of large lakes near Tripoli.
3. From *Carbonate* {
 - a. Dried Carbonate of Soda.*
 - b. Liquor Sodæ.*
 - c. Bicarbonate.*
 - d. Acetate.*
 - e. Arseniate (see ARSENIC).*
 - f. Biborate (partly).*
 - g. Hypophosphite (see PHOSPHORUS).*
 - h. Phosphate.*
 - i. Soda Tartarata.*
4. From {
 - a. Effervescent Citro-tartrate.*
 - Bicarbonate b. Liquor Sodæ Effervescens.*
5. From {
 - Liquor a. Caustic Soda.*
 - Sodæ b. Valerianate*
6. From *Carbonate and Chloride*—Sulphate.

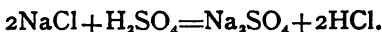
The actual preparation of the different compounds will now be considered, excluding those referred to elsewhere, in the following order:—

A. Chloride.—Obtained by the evaporation of sea-water or spring-water containing the salt; or of solution of rock salt.

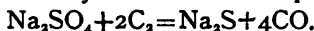
B. Carbonates.

1. *Carbonate*—This salt is now made thus:—

a. Act on **chloride of sodium** by **sulphuric acid**.



b. Mix the sodic sulphate with **charcoal** and **chalk**, and heat in a reverberatory furnace. Sulphate is reduced by the carbon to sulphide.



The sulphide reacts on the chalk, oxysulphide of calcium and sodic carbonate being formed.



c. Dissolve the crude carbonate out with water; and heat with sawdust. CO_2 is formed by combustion, and converts into carbonate any caustic soda produced by the action of lime on the sodic carbonate.

2. *Dried Carbonate*.—Drive off the water of crystallization from the carbonate by heat, first gradually, and then to redness; and rub it to powder.

3. *Bicarbonate*—a. Pass CO_2 gas under pressure into a mixture of { **Carbonate, 2.**
Dried carbonate, 3.

b. Shake for half an hour with half its weight of water; drain, and dry the undissolved portion by exposure to air on filtering paper on porous bricks.

c. Wash the powder with water, to remove any undecomposed carbonate.

(The *dried carbonate* is used to prevent CO_2 from disengaging enough water to dissolve the bicar-

bonate, and lead to its crystallization on the apparatus).

C. Forms of Soda.

1. *Liquor Sodæ*.—By the action of **slaked lime** on solution of **carbonate of soda**, by a process similar to that by which *Liquor potassæ* is made.

2. *Caustic Sodæ*.—From **Liquor sodæ**, by a similar process to that in which *Caustic Potash* is prepared.

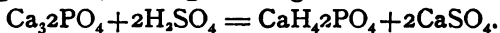
D. **Other inorganic salts**.—Some of these are considered in other parts of these notes, and only the following need be alluded to here :—

1. *Borax*.—This salt is either prepared by purifying “tincal” or “crude borax”; or by saturating the **boracic acid** of Tuscany with **carbonate of soda**.

2. *Nitrate*.—The “Peruvian” or “Chilian” nitre is purified by making a watery solution, and crystallizing.

3. *Phosphate*.—The preparation of this salt is complicated, but the process may be thus described in outline :—

a. Act on **bone-ash** by **sulphuric acid**, in a large vessel, stirring with a glass rod.



The acid phosphate of calcium remains in solution, the calcic sulphate being mainly precipitated:

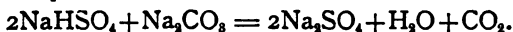
b. Then follows a process of digesting with water; filtering through calico; washing the calcic sulphate on the filter; concentrating the filtrate; and filtering again after standing 24 hours.

c. Heat to near the boiling point, and add a solution of **carbonate of soda**, till it ceases to form a precipitate, and the liquid has a feeble alkaline reaction; phosphate of soda remains in solution.



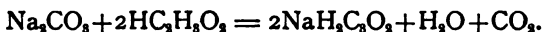
d. Filter, evaporate, crystallize, and dry the crystals rapidly, and without heat, on filtering paper on porous bricks. Preserve in stoppered bottles.

4. *Sulphate*.—The residue left in the preparation of HCl from NaCl by the action of H_2SO_4 is **acid sulphate of soda** $= \text{NaHSO}_4$. Neutralize this with **carbonate of soda**; and crystallize out the neutral sulphate.



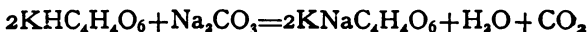
E. Organic Salts.

1. *Acetate*.—Add **carbonate of soda** to **acetic acid** until effervescence ceases, and evaporate the solution.



2. *Effervescent Citro-Tartrate*.—Heat a mixture of **bicarbonate of soda**, powdered **tartaric acid**, and **citric acid** to between 200° and 220° . When they begin to aggregate, stir constantly until they assume a granular form. Separate by sieves.

3. *Tartarated Soda*.—*a*. Add gradually **acid tartrate of potash** to a boiling solution of **carbonate of soda**, and boil for a few minutes, adding one or the other to neutralization.



b. Filter, concentrate by evaporation, and crystallize.

Valerianate.—In making this salt, valerianic acid is first prepared by oxidation of amylic alcohol (fousel oil), and the acid is neutralized by Liquor Sodæ. The essential parts of the process are as follows:—

<p><i>a</i>. Distil in a matrass until about half a gallon has passed over into the condenser, a mixture of</p>	{	<p>Sulphuric acid, $\bar{3}6\frac{1}{2}$ Water, $\bar{3}10$ Bichromate of potash, $\bar{3}9$ Water, $03\frac{1}{2}$. Amylic alcohol, $\bar{3}4$</p>	}	<p>Dissolved with gentle heat.</p>
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b. Saturate the distilled liquid accurately with **solution of soda**; remove any oil which floats on the surface; evaporate till watery vapour ceases to escape; and then raise the heat cautiously, so as to liquefy the salt.

c. When cooled and solidified, break into pieces, and immediately put into a stoppered bottle.

CHARACTERS AND PROPERTIES.—The compounds of sodium, like those of potassium, may be considered in certain groups, as regards their characters and properties.

A. Caustic Soda.—Characters similar to those of caustic potash, except—

a. Most frequently in whitish or greyish-white fragments or cakes; may be cast into sticks, like those of caustic potash.

b. Less deliquescent.

c. Less caustic.

B. Liquor Sodæ.—Similar characters to liquor potassæ. Sp. gr. = 1.047.

C. White Powders or Granules.

1. Dried Carbonate.—A white powder; other characters like the carbonate.

2. Bicarbonate.

a. An opaque powder, or small irregular scales.

b. Saline, slightly alkaline taste; not caustic or unpleasant.

c. Soluble in water (1 in 10).

3. Effervescent Citro-Tartrate.

a. White grains.

b. Soluble in water with effervescence.

D. White or Colourless Crystals.—The prominent characters of this group may be arranged in a tabular form:—

	CRYSTALS.	REACTION.
1. <i>Acetate.</i>	Colourless and transparent.	Neutral.
2. <i>Borax.</i>	Large 6-sided prisms, flattened. Semi-transparent.	Weakly alkaline.
3. <i>Carbonate.</i>	Laminar crystals of rhombic shape; colourless and transparent.	Strongly alkaline.
4. <i>Nitrate.</i>	Obtuse rhombohedra; colourless.	Neutral.
5. <i>Phosphate.</i>	Large oblique rhombic prisms terminating by four converging planes; transparent.	Faintly alkaline.
6. <i>Sulphate.</i>	6-sided oblique rhombic prisms; transparent.	Neutral.
7. <i>Chloride.</i>	Small, white, crystalline grains; or transparent cubic crystals.	Neutral.
8. <i>Tartarated Soda.</i>	Prisms, or halves of prisms, of right rhombic order; generally 8-sided. Large. Transparent.	Neutral.

TASTE.	SOLUBILITY.	CHANGES.
Sharp and bitter.	Very soluble in water.	Slowly efflorescent. Decomposed by heat, carbonate remaining.
Saline.	Water (1 in 22). Boiling Water (1 in 2). Glycerine (1 in 1), and this agent aids solution in water. Insoluble in rectified spirit.	Slightly efflorescent. Heat causes aqueous fusion, and the liquid cools to a transparent glass bead.
Harsh, alkaline, and caustic taste.	Water (1 in 2). Dilute acids, with effervescence. Insoluble in rectified spirit.	Effloresces and crumbles. Aqueous fusion with heat, and then dries up, losing 63 per cent. by weight.
Cooling and saline.	Water (1 in 2).	Slightly deliquescent. Deflagrates with heat.
Saltish ; mild.	Water (1 in 5). Insoluble in rectified spirit.	Efflorescent. Loses 63 per cent. of weight by heat.
Cool, saline, and bitter.	Water (1 in 3), and measures $3\frac{1}{2}$. Insoluble in rectified spirit.	Effloresces. Loses 55.9 per cent. of weight by heat.
Typically salt or saline.	Water (1 in $2\frac{3}{4}$). Slightly in rectified spirit ; not in pure alcohol.	Should not deliquesce, but often does a little, from presence of impurities.
Saline, and slightly bitter.	Water (1 in $1\frac{1}{2}$). Insoluble in rectified spirit.	Heated, leaves an alkaline residue = carbonate.

E. Valerianate.—This salt has special characters:—

- a. In dry white masses.
- b. Has no alkaline reaction.
- c. Entirely soluble in rectified spirit.
- d. Gives out a powerful odour of valerian on adding sulphuric acid.

IMPURITIES.—The chief are as follows:—

a. *Liquor Sodæ.*—Carbonic acid; lime and magnesia; usually a trace of sulphate and chloride.

b. *Carbonate* and *Bicarbonate.*—Sulphate and chloride; usually contain a trace.

c. *Chloride*—Sulphate; magnesia.

QUANTITATIVE TESTS.—These may be considered on the same plan as in the case of potassium.

Grain measures
of Vol. solution
of oxalic acid.

a. Power of Neutralization.

(i) Caustic Soda, 40 grains . . .	= 900
(ii) Liquor Sodæ, 1 fl 3 or 458 grains	= 470
(iii) Bicarbonate, 84 grains, exposed to red heat, leave 53 grains = carbonate.	} = 1000
(iv) Carbonate, 143 grains	
(v) Dried Carbonate, 53 grains	} = 960
(vii) Tartarated Soda, 141 grains, heated to redness till gases cease to escape, leave alkaline residue=carbonate.	
	= 1000

b. Special Tests.—Only one salt calls for notice in this connection.

Sulphate.—100 grains dissolved in distilled water acidulated with hydrochloric acid, give with solution of chloride of barium a white precipitate, which, when washed and dried, weighs 72.2 grains.

used for burns. Internally, antacid; antilithic; stimulant to gastric secretion; alterative. *Doses*.—Carbonate, gr. 3 to 10. Bicarbonate (usually given internally) gr. 10 to 30. Liquor Sodæ Effervescens, $\frac{3}{4}$ 10. Trochisci Sodæ Bicarbonatis, 1 to 6.

4. *Acetate*.—Mild diuretic; seldom used.

5. *Borax*.—Local sedative. Diuretic. Antacid. Emmenagogue. *Dose*.—gr. 10 to 60.

- | | |
|---|---|
| 6. <i>Phosphate</i> . <i>Dose</i> .— $3\frac{1}{2}$ to $\frac{3}{4}$ 1. | $\left. \begin{array}{l} \text{Diuretic} \\ \text{in smaller} \\ \text{doses.} \\ \text{Purgative} \\ \text{in larger} \\ \text{doses.} \end{array} \right\}$ |
| 7. <i>Sulphate</i> . <i>Dose</i> .— $3\frac{1}{2}$ to $\frac{3}{4}$ 1. | |
| 8. <i>Tartarated Soda</i> . <i>Dose</i> .— $3\frac{1}{2}$ to $\frac{3}{4}$ 1. | |
| 9. <i>Citro-Tartrate</i> . <i>Dose</i> .—3 1 to $\frac{3}{4}$ 1. | |

10. *Valerianate*.—Nervine tonic and Antispasmodic; seldom used. *Dose*.—gr. 1 to 5.

LITHIUM.

The official preparations of lithium are only three in number, and the principal facts required to be known about them may be conveniently given in a tabular form.

NAME.	PREPARATION.	PROPERTIES.
1. <i>Lithiæ Carbonas</i> — <i>Carbonate of Lithia</i> = Li_2CO_3 .	By the action of carbonate of ammonia on sulphate or chloride of lithium . The chloride is made by dissolving native hydrate in HCl.	a. White powder or minute crystalline grains. b. Alkaline reaction. c. Soluble in water (1 in 100); solubility increased by CO_2 . Insoluble in alcohol.
2. <i>Lithiæ Citras</i> — <i>Citrate of Lithia</i> = $\text{Li}_3\text{C}_6\text{H}_5\text{O}_7$.	a. Dissolve by heat, Carbonate of Lithia , gr. 50 (Citric Acid , gr. 90 (100 in { Squire). Water , $\frac{3}{4}$ l.). b. Evaporate to a viscid liquid. c. Dry at 240° , and pulverise.	a. White amorphous powder. b. Deliquescent. c. Soluble in water (1 in $2\frac{1}{2}$). (Squire says is crystalline, and not deliquescent). B.P.
3. <i>Liquor Lithiæ Effervescens</i> — <i>Lithia Water</i> .	Like potash and soda water. Contains gr. 10 of carbonate in O i.	A clear, colourless liquid.

QUANTITATIVE TESTS AND IMPURITIES.

1. *Lithiæ Carbonas*—Ten grains, neutralized with H_2SO_4 , and heated to redness = 14·86 grains, which when redissolved in distilled water, yield no precipitate with oxalate of ammonia or solution of lime = absence of lime, magnesia, and alumina.

2. *Lithiæ Citras*—Twenty grains, burned at a low red heat, with free access of air, leave 10·6 grains = carbonate.

ACTION.—Antacid. Diuretic. Antilithic. Solvent of uric acid.

Dose.—Carbonate, gr. 3 to 6; Citrate, gr. 5 to 10; Liquor Lithiæ Effervescens, $\frac{3}{5}$ 5 to 10.

ALUMINIUM.

Only certain forms of *Alum* are officinal, and they may be considered in a tabular arrangement.

NAME.	SOURCE AND PREPARATION.	PROPERTIES.
1. <i>Alumen</i> , <i>Alum</i> , <i>Sulphate of</i> <i>Alumina</i> and <i>Ammonia</i> = $\text{NH}_4\text{Al}(\text{SO}_4)_2$, $12\text{H}_2\text{O}$.	From <i>alum-schist ore</i> .—A mixture of alumina with ferric sulphide. <i>a.</i> Roast the schist, and then expose to the air. Sulphuric anhydride and ferrous sulphide are formed. The former combines with the alumina = $\text{Al}_2(\text{SO}_4)_3$; the latter is changed to ferrous sulphate. <i>b.</i> Lixivate, by which the sulphates are dissolved out; and evaporate, in order to crystallize out the ferrous sulphate. <i>c.</i> Add a concentrated solution of sulphate of ammonia to the remaining liquid; and crystallize the alum. Purify by re-solution and re-crystallization.	<i>a.</i> Crystalline masses, with faces of regular octahedron. <i>b.</i> Colourless and transparent. <i>c.</i> Acid, sweet, and astringent taste. <i>d.</i> Soluble in water (1 in 10); boiling water (10 in 8); glycerine (1 in 4). Insoluble in rectified or proof spirit. <i>e.</i> Strongly acid reaction. <i>f.</i> Slightly efflorescent in dry air. <i>g.</i> Melts with heat in its own water of crystallization, which is afterwards driven off. Strongly heated, is decomposed, and loses its acid. <i>h.</i> Impurity = iron. <i>i.</i> Forms insoluble compounds with albumin, fibrin, casein, and gelatin.
2. <i>Alumen Exsiccatum</i> — <i>Dried or Burnt Alum</i> = Alum deprived of its water of crystallization = 47 per cent. by weight.	Heat alum in a porcelain capsule till it liquefies; raise the heat not above 400° , and continue till aqueous vapour ceases to be disengaged. Reduce the residue to powder.	<i>a.</i> A white spongy mass, or powder. <i>b.</i> Insoluble in water; but takes up water of crystallization slowly, with evolution of heat.

ACTION.—Powerful astringent. Purgative and emetic in large doses. Dried alum is slightly escharotic, and only used externally. Alum is given for whooping-cough. *Dose.*—Gr. 10 to 20 or more.

CALCIUM.

GENERAL SUMMARY.—The officinal calcium-compounds may be conveniently arranged thus:—

1. **Forms of Lime.** {
 - a. *Calx*—Quicklime= CaO .
 - b. *Calcis Hydras*—Slaked Lime = CaH_2O_2 .
2. **Solutions of Lime.** {
 - a. *Liquor Calcis*—Lime-water.—A solution of slaked lime in water = about gr. $\frac{1}{2}$ in $\frac{3}{4}$ j.
 - b. *Liquor Calcis Saccharatus*.—A saccharine solution of lime = 711 grains in $\frac{3}{4}$ j.
3. **Forms of Carbonate** = CaCO_3 . {
 - a. *Creta*—Chalk.
 - b. *Creta Præparata* — Prepared chalk.
 - c. *Calcis Carbonas Præcipitata*.—Precipitated Carbonate of Lime.
4. **Other Salts.** {
 - a. *Calx Chlorata* (see CHLORINE).
 - b. *Calcii Chloridum*—Chloride of Calcium= CaCl_2 .
 - c. *Calcis Hypophosphis*= $\text{Ca}_2\text{PH}_2\text{O}_2$ (see PHOSPHORUS).
 - d. *Calcis Phosphas*—Phosphate of Lime. = $\text{Ca}_3\text{P}_2\text{O}_8$.
5. **Special Officinal Preparations.** {
 - a. *Mistura Cretæ*—Chalk Mixture.
 - b. *Pulvis Cretæ Aromaticus*.
 - c. *Pulvis Cretæ Aromaticus cum Opio*.
 - d. *Hydrargyrum cum Cretâ*—Grey Powder (see MERCURY).
 - e. *Linimentum Calcis*.
 - f. *Liquor Calcis Chloratæ* (see CHLORINE).

6. **Test-solutions in Appendix.** { *a. Solution of Chloride of Calcium = $\frac{3}{1}$ to $\frac{3}{10}$.*
b. Saturated Solution of the same.

SOURCE AND PREPARATION.—The sources of the preparations of calcium may be thus tabulated:—

- | | |
|-----------------------------------|---|
| A. <i>Native.</i> | <i>Creta—Chalk.</i> |
| B. <i>From Chalk.</i> | { 1. <i>Calx—Lime.</i>
2. <i>Creta Præparata, or Prepared Chalk.</i>
3. <i>Calcii Chloridum.</i> |
| C. <i>From Lime.</i> | <i>Calcis Hydras—Slaked Lime.</i> |
| D. <i>From Calcic Hydrate.</i> | { 1. <i>Calx Chlorata (see CHLORINE).</i>
2. <i>Calcis Hypophosphis (see PHOSPHORUS).</i>
3. <i>Liquor Calcis—Lime-Water.</i>
4. <i>Liquor Calcis Saccharatus.</i> |
| E. <i>From Chloride.</i> | <i>Calcis Carbonas Præcipitata.</i> |
| F. <i>Special, from Bone-Ash.</i> | } <i>Calcis Phosphas.</i> |

The actual preparation of these compounds may be discussed as follows:—

A. Lime and its Solutions.

1. *Lime.*—By calcining **chalk**, the CO_2 being thus expelled— $\text{CaCO}_3 = \text{CaO} + \text{CO}_2$.

2. *Slaked Lime.*—Act upon **lime** by **water** in a metal vessel. When vapour ceases to be disengaged, set aside to cool; then sift and preserve in well-stoppered bottles. Should be recently prepared.

3. *Liquor Calcis.*—Saturate **distilled water** with **slaked lime**. Decant or draw off with a syphon when using the solution.

4. *Liquor Calcis Saccharatus.*

Digest for some hours, with occasional agitation, and strain

(Slaked lime, 1	,
(Refined sugar, 2	,
(Distilled water, 20)

B. Forms of Carbonate.

1. *Chalk*.—This is merely impure native carbonate of lime.

2. *Creta Præparata*.—**Chalk** is reduced to fine powder, elutriated, and dried in small cones.

3. *Calcis Carbonas Præcipitata*.

a. Mix solutions in *boiling* water of

{	Calcium chloride, $\frac{3}{4}$ 5	}	Each in 2 pints.
{	Carbonate of soda, $\frac{3}{4}$ 13	}	

b. Collect the precipitate on a calico filter; wash away the NaCl with boiling water; and dry at 212° .

C. Other Salts.

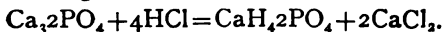
1. *Chloride*.—a. Neutralize **chalk** with **hydrochloric acid**, adding a little of the **solution of chlorinated lime** and **slaked lime**, to peroxidize and precipitate any iron present.

b. Filter; evaporate the liquid until it is solid; and dry at about 100° .

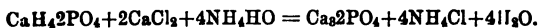
2. *Phosphate*. This process is rather complicated.

a. Dissolve **bone-ash, $\frac{3}{4}$ 4** in

{	Hydrochloric acid, $\frac{3}{4}$ 6	}
{	Water, O 1.	}



b. Filter; add **water**=O 1, and then **solution of ammonia**, until the mixture is alkaline.



c. Wash the precipitate with boiling water, to remove NH_4Cl ; dry not above 212° .

CHARACTERS AND PROPERTIES.—This part of the subject may be considered thus :—

1. **Calx—Lime.**

- a. Hard, compact, flaky masses.
- b. Whitish, or white when pure.
- c. When well sprinkled with water, rapidly absorbs it, cracks, splits up, evolves much heat, and crumbles to powder.
- d. Solubility in $\left\{ \begin{array}{l} \text{at } 32^{\circ} = 13.25 \text{ grains.} \\ \text{3 20 of } \left\{ \begin{array}{l} \text{at } 60^{\circ} = 11.2 \text{ ,,} \\ \text{water. } \left\{ \begin{array}{l} \text{at } 212^{\circ} = 6.7 \text{ ,,} \end{array} \right. \end{array} \right. \end{array} \right.$

2. **Calcis Hydras—Slaked Lime.**

- a. White, bulky powder.
- b. Strongly alkaline reaction.
- c. Caustic taste.
- d. Soluble in water (1 in 900); much more soluble in glycerine, and with sugar.

3. **Solutions of Lime.**

- a. Colourless, but the saccharated solution is liable to become brownish by keeping.
- b. Alkaline reaction.
- c. Readily absorb CO_2 from the air, and become covered with a film of carbonate of lime.

4. **Carbonates.**

- a. *Appearance* $\left\{ \begin{array}{l} \text{(i) Chalk — irregular whitish masses.} \\ \text{(ii) Prepared Chalk — white cone-shaped masses, or in powder = minute crystals.} \\ \text{(iii) Precipitated Carbonate — white crystalline powder.} \end{array} \right.$
- b. Insoluble in water; soluble in dilute acids, with effervescence.

5. **Chloride.**

- a. Agglutinated masses.
- b. White; semi-transparent.
- c. Very deliquescent; rapidly absorbs water; a powerful desiccating agent.
- d. Soluble in water (1 in 2), and can be crystallized in prisms; in rectified spirit (1 in 4).
- e. Bitter, acrid, and saline taste.

6. **Phosphate.**

- a. Very light, white, amorphous powder.
- b. Insoluble in water; soluble in HCl, without effervescence.

IMPURITIES.—As given in the B.P., these are :—

- 1. *Lime*—Carbonate and phosphate.
- 2. *Slaked lime*—Carbonate.
- 3. *Carbonates*—Phosphate and chloride.
- 4. *Chloride*—Hypochlorite or chlorine, evolved on addition of HCl.
- 5. *Phosphate*—Carbonate.
- 6. *Solutions of lime*—Carbonate.

QUANTITATIVE TESTS.—These only refer to the power of Neutralization.

- | | | |
|-------------------------------------|-------------------------------|---|
| | | Grain-measures
of Vol. sol. of
oxalic acid. |
| 1. Liquor Calcis, | $\frac{3}{4}$ 10 | = at least 200. |
| 2. Liquor Calcis }
Saccharatus } | $\frac{3}{4}$ 1 or 460.2 grs. | = 254. |

PHARMACY.—1. *Officinal Preparations.*—Those necessary to notice here are :—

- a. *Linimentum Calcis* { Solution of lime, 1 } Mix.
= a thickish cream { Olive oil, 1 }
- b. *Mistura Cretæ* { Prepared chalk, 1 } Mix
Dose— $\frac{3}{4}$ 1 to 2. { Gum acacia, 1 } by tri-
{ Syrup, 2 } tura-
{ Cinnamon Water, 30 } tion.

- c. *Pulvis Cretæ Aromaticus*. { Prepared chalk, 11
Cinnamon, 4
Nutmeg, 3
Saffron, 3
Cloves, 1½
Cardamoms, 1
Refined sugar, 25 } Mix in powders.
= dark fawn colour.
Chalk=1 in 4 nearly.
Dose—gr. 15 to 60.
- d. *Pulvis Cretæ Aromaticus cum Opio*. { Aromatic Powder of chalk, 39
Powdered opium, 1 } Mix, and pass through a sieve.
= dark fawn colour.
Dose—gr. 10 to 40.

2. Calcium compounds are employed in pharmacy as follows:—

- a. *Slaked lime* used in making chlorate of potash.
- b. *Chalk* used in making CO_2 .
- c. *Precipitated carbonate* contained in Trochisci Bismuthi.
- d. *Prepared chalk* contained in Hydrargyrum cum Cretâ.
- e. *Phosphate* contained in Pulvis Antimonialis.
- f. *Chloride of calcium* is frequently employed as a desiccating agent.

3. *Incompatibles*.—Those calling for notice are:—

- a. *Calcic hydrate*.—Mineral and vegetable acids; alkaline and metallic salts; tartar emetic.
- b. *Carbonates*.—Acids; Sulphates.

ACTION.—The action of the preparations of calcium used therapeutically, and not noticed elsewhere, are easily summarized thus:—

1. *Solution of lime*.—Antacid. Gastric sedative. Astringent. Supplies lime to system. *Linimentum Calcis* is used as an application to burns and scalds.

Dose—of *Liquor*, $3\frac{1}{2}$ to 4; of *Liquor Saccharatus*, m 15 to 60.

2. *Carbonates*.—Antacid. Astringent, especially *Creta Præparata*. Used externally to burns. Dose—gr. 1 to 60 or more (see OFFICIAL PREPARATIONS).

3. *Phosphate*.—Alterative. Special nutrient to bones, in rickets, &c. Dose—gr. 10 to 40.

CERIUM.

There is only one officinal compound of this metal, namely:—

Cerii Oxalas or *Oxalate of Cerium* = $\text{CeC}_2\text{O}_4, 3\text{H}_2\text{O}$.

PREPARATION.—Precipitate the **chloride** or other soluble salt of **cerium** by **oxalate of ammonia**.

CHARACTERS AND PROPERTIES:—

1. A white granular powder.
2. Insoluble in water.
3. Decomposed by dull-red heat to a reddish-brown powder = CeO and CeO_2 . 10 grains incinerated lose 5.2 grains in weight.

ACTION.—Gastric sedative.

Dose—gr. 1 to 2.

4. **Liquor Magnesiae Carbonatis.**

- a. Add { **Carbonate of soda**, $\frac{3}{4}$ 2 $\frac{1}{2}$ } to
 { **Water**, O $\frac{1}{2}$
 { **Sulphate of magnesia**, $\frac{3}{4}$ 2
 { **Water**, O $\frac{1}{2}$, heated to boiling point.
- b. Boil until CO₂ is no longer evolved.
- c. Collect and wash the precipitated carbonate.
- d. Mix with **water** O 1, and saturate with CO₂ gas under slight pressure.
- e. Filter after 24 hours, and again pass in CO₂ gas.

5. **Liquor Magnesiae Citratis.**

- a. Dissolve **carbonate** { **Citric acid**, gr. 200
 of **magnesia**, gr. 100, in { **Water**, $\frac{3}{4}$ 2.
- b. Filter into a strong half-pint bottle.
- c. Add { **Syrup of Lemons**, $\frac{3}{4}$ 1
 { **Water**, nearly to fill the bottle.
- d. Put in crystals of **bicarbonate of potash**, gr. 40; secure the cork with a wire; and shake until dissolved.

CHARACTERS AND PROPERTIES.—These may be readily summed up thus:—

1. **Magnesias and Carbonates.**

- a. All are apparently white powders, but the *carbonate* is minutely granular, and the *light carbonate* contains slender prisms intermixed.
- b. The *light* forms are much the more bulky, in the case of the *magnesias* the volumes corresponding to similar weights being = $3\frac{1}{2}$ to 1.
- c. Very sparingly soluble in water, more in *cold* than in *boiling* water.
- d. Soluble in dilute acids, the carbonates with effervescence.
- e. The *magnesias*, when moistened, are alkaline to test-paper.

2. Sulphate.

- a.* Minute crystals=rhombic prisms.
- b.* Colourless and transparent.
- c.* Soluble in water (10 in 13), and the solution is condensed to 18. Insoluble in alcohol.
- d.* Strongly bitter and unpleasant taste.
- e.* Slowly effervesces when exposed to the air.

3. Liquores.—Clear and colourless solutions.

IMPURITIES.—As given in the B.P., these are :—

- 1. *Magnesias*—Lime ; sulphate ; CO_2 .
- 2. *Carbonate*—Lime ; sulphate.
- 3. *Sulphate*—Lime ; iron.

QUANTITATIVE TESTS.

1. *Carbonates.*—50 grains calcined at a red heat are reduced to 22 grains.

2. *Sulphate.*—The precipitate obtained by adding carbonate of soda to boiling solution of 100 grains, when well-washed, dried, and heated to redness = 16.26 grains.

PHARMACY—1. *Officinal Preparation* :—*Enema Magnesiae Sulphatis*—

Dissolve { Sulphate of magnesia, $\frac{3}{4}$ i
 Mucilage of starch, $\frac{3}{4}$ i5
 Add Olive oil = $\frac{3}{4}$ i, and mix.

2. The other preparations in which the compounds of magnesium are contained are as follows :—

a. Light magnesia contained in Pulvis Rhei Compositus.

b. Sulphate { (i). Mistura Sennæ Composita.
 (ii). Test-Solution of Ammonio-sulphate of Magnesia in the Appendix.

3. *Incompatibles.*—Those requiring notice include :—

a. Magnesia.—Acids.

b. Sulphate.—Lime-water ; alkaline carbonates ; acetate of lead ; nitrate of silver.

ACTION.—1. The *magnesias* and their *carbonates* are antacid.

2. All the preparations of magnesia are more or less aperient, the *sulphate* being a valuable saline aperient.

Doses.—Of the *Magnesias* and *Carbonates*, as antacids, gr. 10 to 20; as aperients, gr. 30 to 60. Of *Sulphate*, ʒ 2 to 4. Of *Liquor Magnesiae Carbonatis*, ʒ 1 to 2. Of *Liquor Magnesiae Citratis*, ʒ 5 to 10.

ANTIMONIUM—ANTIMONY.

GENERAL SUMMARY.—The B.P. preparations containing antimony are:—

1. **Antimonium Nigrum—Black Antimony** = **Antimonious Sulphide**, Sb_2S_3 .
2. **Antimonium Sulphuratum—Sulphurated Antimony**.—A mixture of SbS_3 with a variable amount of *antimonious oxide*, Sb_2O_3 , generally about 12 per cent.
3. **Antimonii Oxidum—Oxide of Antimony** = Sb_2O_3 .
4. **Antimonium Tartaratum—Tartarated Antimony** or **Potassio-tartrate of Antimony—Tartar Emetic** = $\text{K}(\text{SbO})\text{C}_4\text{H}_4\text{O}_6, \text{H}_2\text{O}$.
5. **Liquor Antimonii Chloridi**.—"Butter of Antimony."—A solution of *Antimonious Chloride* (SbCl_3) in *Hydrochloric acid*.

- | | | |
|---|---|---|
| 6. Special
Officinal
Preparations. | { | <i>a. Pulvis Antimonialis</i> —Antimonial powder. A modification of James's powder. |
| | | <i>b. Vinum Antimoniale</i> —Antimonial wine. |
| | | <i>c. Unguentum Antimonii Tartarati</i> —Ointment of Tartarated Antimony. |

SOURCES AND PREPARATION.—The following table indicates the sources of the compounds of antimony:—

1. *Native*.—**Antimonium Nigrum**.
2. From {

<i>a. Antimonium Sulphuratum.</i>
<i>Black Sulphide.</i> { <i>b. Liquor Antimonii Chloridi.</i>
3. From *Liquor Antimonii Chloridi*.—**Antimonii Oxidum**.
4. From the *Oxide*.—**Antimonium Tartaratum**.

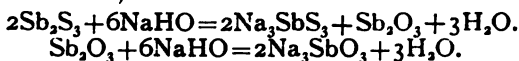
Their actual preparation is as follows:—

1. **Black Antimony.**—Fuse the **native sulphide**, to purify from siliceous matter; and reduce to fine powder.

2. **Sulphurated Antimony.**

a. Boil for two hours, $\left\{ \begin{array}{l} \text{with frequent stir-} \\ \text{ring, adding water} \end{array} \right. \left\{ \begin{array}{l} \text{Black antimony, } \frac{3}{10}. \\ \text{Solution of soda, } 0\frac{1}{2}. \end{array} \right.$
occasionally

A double sulphide, and a double oxide are formed, thus:—

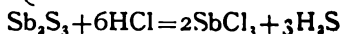


b. Strain through calico, and *before it cools* add gradually **diluted sulphuric acid** to slight excess. Sulphate of sodium is formed, and sulphurated antimony is precipitated.

c. Collect on a calico-filter; wash with water from sulphate of sodium; dry under 212° .

3. **Liquor Antimonii Chloridi.**

Dissolve by $\left\{ \begin{array}{l} \text{the aid of} \\ \text{heat} \end{array} \right. \left\{ \begin{array}{l} \text{Black antimony, lb i} \\ \text{Hydrochloric acid, O4.} \end{array} \right. \left. \right\} \begin{array}{l} \text{Boil} \\ \text{down to} \\ 2 \text{ pints.} \end{array}$



The H_2S gas escapes through a flue.

4. **Oxide of Antimony.**

a. Mix $\left\{ \begin{array}{l} \text{Liquor antimonii chloridi, } \frac{3}{16}. \\ \text{Distilled water, C2.} \end{array} \right.$ thoroughly

b. Repeat a series of processes of allowing the precipitate to subside; removing the liquid by a syphon; adding water; agitating; and again allowing to subside. *Oxychloride of Antimony*, $2\text{SbCl}_3, 5\text{Sb}_2\text{O}_3$, is thus formed.

- c. Add, and leave in contact for half an hour, stirring frequently $\left\{ \begin{array}{l} \text{Carbonate of soda, } \frac{3}{6}. \\ \text{Distilled Water, } 02. \end{array} \right.$
- $$2\text{SbCl}_3 + 5\text{Sb}_2\text{O}_3 + 3\text{Na}_2\text{CO}_3 = 6\text{Sb}_2\text{O}_3 + 6\text{NaCl} + 3\text{CO}_2$$
- d. Collect the deposit of oxide of antimony on a calico filter; wash away the chloride of sodium with boiling distilled water; and dry under 212° .

5. Tartarated Antimony—Tartar Emetic.

- a. Make a paste with $\left\{ \begin{array}{l} \text{Oxide of antimony, } \frac{3}{5} \\ \text{Finely-powdered cream} \end{array} \right.$ Set aside for 24 hours. water of $\left\{ \begin{array}{l} \text{of tartar, } \frac{3}{6}. \end{array} \right.$
- b. Add water = 02, and boil for a quarter of an hour, stirring frequently.
- c. Filter; set aside to crystallize; evaporate for further crystals; and dry on filtering paper at the temperature of the air.
- $$\text{Sb}_2\text{O}_3 + 2\text{KHC}_4\text{H}_4\text{O}_6 = 2\text{KSbC}_4\text{H}_4\text{O}_7 + \text{H}_2\text{O}.$$

CHARACTERS AND PROPERTIES.—The properties of the preparations of antimony may be thus described:—

1. Black Antimony.

- a. A greyish-black, crystalline powder.
- b. Insoluble in water; soluble almost entirely in boiling HCl, giving off H_2S .
- c. Fuses below red heat.

2. Sulphurated Antimony.

- a. A bright orange or golden-red powder.
- b. Odourless; slight taste.
- c. Insoluble in water or spirit; readily soluble in caustic soda; also in HCl, evolving H_2S , a little sulphur being deposited.
- d. Partially decomposed on exposure to light and air, with separation of sulphur.
- e. Burns with a greenish-blue flame, giving off SO_2 , and a greyish oxide remains.

3. **Oxide of Antimony.**

- a. A greyish-white powder.
- b. Insoluble in water or spirit; soluble in hydrochloric, acetic, and tartaric acids; and in the caustic alkalies.
- c. The solution in HCl, when dropped into water, gives a white precipitate—*Oxychloride of antimony*.
- d. Fusible at a low red heat.

4. **Tartarated Antimony.**

- a. Crystalline=rhombic octahedra, with triangular facets.
- b. Colourless and transparent.
- c. Slight metallic taste.
- d. Efflorescent, and becomes opaque on exposure.
- e. Soluble in cold water (1 in 15), boiling water (1 in 2), partially in proof spirit, not in alcohol.
- f. The aqueous solution has an acid reaction, and decomposes readily, with the formation of algæ.
- g. Decrepitates and then decomposed by heat, becoming blackened.

5. **Liquor Antimonii Chloridi.**

- a. A yellowish-red heavy liquid.
- b. Gives a white precipitate of oxychloride when dropped into water.
- c. Destructive to organic tissues.

IMPURITIES.—The *oxide of antimony* is apt to contain arsenic. Higher oxides may also be present, which do not dissolve when boiled with excess of acid tartrate of potash.

QUANTITATIVE TESTS.

1. *Sulphurated Antimony.*—60 grains dissolved in HCl, and dropped into water, give a white precipitate, which, when washed and dried, weighs about 53 grains.

2. *Tartarated Antimony*.—20 grains dissolve without residue in fl $\frac{3}{4}$ 1 of distilled water at 60°, and the solution gives with H₂S an orange precipitate, which, when washed and dried at 212°, weighs 9.91 grains.

3. *Liquor Antimonii Chloridi*.—1 fluid drachm mixed with a solution of tartaric acid ($\frac{3}{4}$ in $\frac{3}{4}$ 4 of water) forms a clear solution, which, if treated with H₂S, gives an orange precipitate, weighing, when washed and dried at 212°, at least 22 grains.

PHARMACY.—1. *Official Preparations* :—

- a. *Pulvis Antimonialis*. { Oxide of antimony, 1 } Mix.
 Dose—gr. 2 to 6. { Phosphate of lime, 2. }
- b. *Unguentum Antimonii Tartarati* { Tartarated antimony, $\frac{3}{4}$ 1 } Mix.
 { Simple ointment, $\frac{3}{4}$ 1. }
- c. *Vinum Antimoniale*. { Tartarated antimony, gr. 40 }
 { Sherry wine, O 1. }

2. *Antimonium Sulphuratum* is contained in *Compound Calomel Pill* (Plummer's Pill).

3. *Incompatibles*.—These are important in the case of *Tartar Emetic*, the chief being alkalies; lead-salts; gallic and tannic acids; and vegetable astringents generally.

ACTION.—1. *Liquor Antimonii Chloridi*.—A powerful caustic; not used internally.

2. *Oxide and Sulphurated Antimony*.—Diaphoretic. Alterative.

3. *Tartar Emetic*.—External pustulant. Diaphoretic. Sedative expectorant. Depressant. Emetic.

Doses.—Of *Oxide*, gr. 1 to 3. Of *Sulphurated Antimony*, gr. 1 to 5. Of *Tartar Emetic*, as diaphoretic or expectorant, gr. $\frac{1}{10}$ to $\frac{1}{8}$; as depressant, gr. $\frac{1}{4}$ to 1; as emetic, gr. 1 to 3; *Vinum Antimoniale* in proportion.

ARGENTUM—SILVER.

There are only two compounds of silver in the body of the B.P., and they may be described thus:—

NAME.	SOURCE AND PREPARATION.	PROPERTIES AND TESTS.
1. <i>Argentum Nitras</i> — <i>Nitrate of Silver</i> — <i>Lunar</i> <i>Caustic</i> = AgNO_3 .	<p>a. Add { <i>Nitric acid</i>, 32½; <i>Water</i>, 35 } to <i>refined silver</i>, 33, and dissolve with gentle heat.</p> <p>b. <i>Decant</i>; evaporate the liquid; and set aside to crystallize.</p> <p>c. Drain and dry the crystals by exposure to air, avoiding contact with organic substances.</p> <p>d. Fuse the crystals, and run the liquid into moulds.</p>	<p>a. In tabular right rhombic prisms, or cylindrical rods.</p> <p>b. Colourless or white.</p> <p>c. Soluble in water (gr. 100 in m50); also in rectified spirit.</p> <p>d. Darkens on exposure to light, and stains the neck of the containing bottle.</p> <p>e. 10 grains with water and HCl yield a precipitate of chloride of silver = 8·44 grains, when thoroughly washed and dried. The filtrate should leave no residue on evaporation = absence of Nitrate of Potash or Soda.</p>
2. <i>Argentum Oxidum</i> — <i>Oxide of Silver</i> = Ag_2O .	<p>a. Pour { <i>Nitrate of silver</i>, 3½; <i>Water</i>, 34 } into <i>Liquor calcis</i>, O 3½</p> <p>b. Shake well, and set aside to allow the deposit to settle.</p> <p>c. <i>Draw off</i> the fluid; collect the deposit on a filter; wash; and dry under 212°.</p>	<p>a. An olive-brown or black powder.</p> <p>b. Insoluble in water; slightly in ammonia; completely in nitric acid.</p> <p>c. Decomposes in contact with organic matters.</p> <p>d. Heated to redness, 116 grains leave 108 of pure silver.</p>

Test-Solutions in Appendix.

1. *Volumetric Solution of Nitrate of Silver* = 17 grains in 1000 grain-measures.

2. *Solution of* { Nitrate of Silver, $\frac{3}{4}$.
Ammonio-Nitrate { Solution of Ammonia, $\frac{3}{4}$.
of Silver. { Water, $\frac{3}{10}$.

INCOMPATIBLES.—The incompatibles of *nitrate of silver* include alkalies and their carbonates; chlorides; acids (except nitric and acetic); and iodide of potassium; solutions of arsenic; and astringent infusions. The *oxide* is liable to explode when prescribed with creosote or chlorides in pill, and before mixing must be diffused through some simple powder.

ACTION.—*Nitrate of silver* is a local caustic, vesicant, stimulant, or astringent, according to its strength and mode of application. Internally, both *nitrate* and *oxide* are astringent, and nervine tonic. The nitrate is liable to produce a dark line on the gums, followed by discolouration of the skin.

Dose.—Of *Nitrate*, gr. $\frac{1}{8}$ to $\frac{1}{3}$, or more; of *Oxide* gr. $\frac{1}{2}$ to 2 in pill.

ARSENICUM—ARSENIC.

GENERAL SUMMARY. — The B.P. preparations which contain arsenic may be conveniently remembered thus :—

1. **Acidum Arseniosum—Arsenious Acid or White Arsenic** = As_2O_3 .

2. **Salts.**

- a. *Ferri Arsenias—Arseniate of Iron* = $\text{Fe}_2(\text{AsO}_4)$. This salt is usually a mixture of Ferrous and Ferric Arseniate.
- b. *Sodæ Arsenias—Arseniate of Soda* = $\text{Na}_2\text{HAsO}_4, 7\text{H}_2\text{O}$.

3. **Liquores or Solutions.**

The first two solutions contain gr. 4 of arsenic in fl $\frac{3}{4}$ i; the last gr. 4 of arseniate of soda in fl $\frac{3}{4}$ i, being about half the strength.

- a. *Liquor Arsenicalis—Fowler's Solution.* A coloured solution of arsenious acid in water, aided by carbonate of potash, with some arseniate of potash.
- b. *Liquor Arsenici Hydrochloricus.* A diluted solution of arsenic trichloride = AsCl_3 . Similar to *De Valangin's solution*, but about three times stronger.
- c. *Liquor Sodæ Arseniatis.*—A solution of Arseniate of Soda.

SOURCES AND PREPARATION.—This part of the subject may be best considered according to the following plan :—

1. From *Natural Arseniurets.*—Arsenious Acid.

2. From *Arsenious Acid.* { a. *Liquor Arsenicalis.*
b. *Liquor Arsenici Hydrochloricus.*
c. *Sodæ Arsenias.*

3. From *Sodæ Arsenias.* { a. *Liquor Sodæ Arseniatis.*
b. *Ferri Arsenias.*

The actual preparation of these compounds is as follows:—

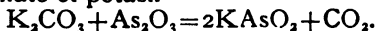
1. **Arsenious Acid—White Arsenic.**

- a. By roasting natural arseniurets, especially arsenical cobalt and mispickite (FeSAs), previous to smelting, the arsenious acid which is formed being collected in chambers through which the flues pass.
- b. It is purified by sublimation and re-sublimation, heating it in a porcelain capsule, covered with a glass flask filled with cold water. The vapour of arsenious acid condenses on the bottom of the flask.

2. **Liquor Arsenicalis—Fowler's Solution.**

- a. Dissolve by the aid of heat { **Arsenious acid**, gr. 80
Carbonate of potash, gr. 80
Distilled water, $\frac{3}{4}$ 10.
- b. When cool, add { **Compound tincture of lavender**, $\frac{3}{4}$ 5
Distilled water, ad O 1.

Arsenious acid is more soluble with carbonate of potash, and this is gradually decomposed, forming arseniate of potash=



The *tincture of lavender* is added for colouring and flavouring purposes, so that this preparation may be recognized and distinguished from the other solutions.

3. **Liquor Arsenici Hydrochloricus.**

- a. Boil until dissolved, { **Arsenious acid**, gr. 80
Hydrochloric acid, $\frac{3}{4}$ 2
Distilled water, $\frac{3}{4}$ 4.
- b. Add **Water** to O 1.

4. **Sodæ Arsenias—Arseniate of Soda.**

- a. Mix thoroughly in a mortar finely-powdered and dry { **Arsenious acid**, $\frac{3}{4}$ 10
Nitrate of soda, $\frac{3}{4}$ 8
Carbonate of soda, $\frac{3}{4}$ 5½.



CHARACTERS AND PROPERTIES.

1. **Arsenious Acid.**—When freshly prepared this substance is transparent and vitreous; it is sometimes in the form of a white powder; and it also forms crystals. As usually seen arsenious acid used medicinally presents the following characters:—

- a. In small masses or fragments, very heavy.
 - b. White, opaque, shiny, like pieces of porcelain or marble.
 - c. Stratified, the layers presenting different degrees of opacity.
 - d. Odourless, and tasteless, but leaves a faint sweetish after-impression
 - e. Soluble in cold water (1 in 100); boiling water (1 in 20); freely in glycerine; slightly in alcohol.
 - f. Entirely volatilizes at a temperature not exceeding 400° , without melting. Sublimes in octahedral crystals. When sprinkled on red-hot coals, it emits an alliaceous or garlic-like odour.
 - g. A solution preserves matters from putrefaction.
2. **Salts.**—These may be arranged in a table.

ARSENIATE OF SODA.

- a. In crystalline prisms.
- b. Colourless; transparent.
- c. Efflorescent.
- d. Soluble in water, the solution being alkaline.
- e. Heated to 300° loses 40·38 per cent. of its weight = water of crystallization.

ARSENIATE OF IRON.

- a. Amorphous powder.
- b. Usually grey or greenish, having changed from its original white colour by keeping, owing to oxidation.
- c. Tasteless.
- d. Insoluble in water; soluble in hydrochloric acid.

3. **Solutions.**—Their characters are as follows:—

LIQUOR ARSENICALIS.	LIQUOR ARSENICI HYDROCHLORICUS.	LIQUOR SODÆ ARSENIATIS.
a. Pale pink colour.	a. Colourless.	a. Colourless.
b. Alkaline reaction.	b. Acid reaction.	b. Alkaline reaction.

b. Expose to a dull-red heat in a covered crucible, until effervescence has ceased, and they are thoroughly melted.

c. Pour out on a clean flag-stone, and when solid, but still warm, put into boiling water ($\frac{3}{35}$), stirring diligently.

d. Filter; crystallize; drain and dry the crystals rapidly on filtering paper; and enclose in stoppered bottles.

Decomposition.—The *arsenious acid* is converted by the nitrate of soda into *arsenic acid*, which expels the CO_2 from the carbonate, and forms *pyroarseniate of soda*:— $\text{As}_2\text{O}_3 + \text{Na}_2\text{CO}_3 + 2\text{NaNO}_3 = \text{Na}_4\text{As}_2\text{O}_7 + \text{CO}_2 + \text{N}_2\text{O}_3$.

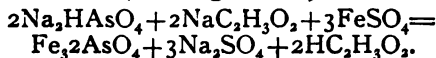
Solution in water converts this into the officinal salt:— $\text{Na}_4\text{As}_2\text{O}_7 + \text{H}_2\text{O} = 2\text{Na}_2\text{HAsO}_4$.

5. **Liquor Sodæ Arseniatis.**

Dissolve { **Anhydrous arseniate of soda**, dried
by a heat not over 30°C , gr. 4
Water, $\frac{3}{1}$.

6. **Ferri Arsenias—Arseniate of Iron.**

a. Mix two solutions { **Sulphate of iron**, $\frac{3}{9}$ }
{ **Boiling water**, 0 3. }
{ **Dried arseniate of soda**, $\frac{3}{4}$ }
{ **Acetate of soda**, $\frac{3}{3}$ }
{ **Boiling water**, 0 2. }



b. Collect the precipitate on a calico filter, and wash completely from sulphate of soda.

c. Squeeze between folds of strong linen in a screw-press, and dry on porous bricks in a warm air-chamber under 100° .

The *acetate of soda* is used to prevent the liberation of free sulphuric acid, in which ferrous arseniate is soluble.

CHARACTERS AND PROPERTIES.

1. **Arsenious Acid.**—When freshly prepared this substance is transparent and vitreous; it is sometimes in the form of a white powder; and it also forms crystals. As usually seen arsenious acid used medicinally presents the following characters:—

- a.* In small masses or fragments, very heavy.
 - b.* White, opaque, shiny, like pieces of porcelain or marble.
 - c.* Stratified, the layers presenting different degrees of opacity.
 - d.* Odourless, and tasteless, but leaves a faint sweetish after-impression
 - e.* Soluble in cold water (1 in 100); boiling water (1 in 20); freely in glycerine; slightly in alcohol.
 - f.* Entirely volatilizes at a temperature not exceeding 400°, without melting. Sublimes in octahedral crystals. When sprinkled on red-hot coals, it emits an alliaceous or garlic-like odour.
 - g.* A solution preserves matters from putrefaction.
2. **Salts.**—These may be arranged in a table.

ARSENIATE OF SODA.

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- e.* Heated to 300° loses 40·38 per cent. of its weight = water of crystallization.

ARSENIATE OF IRON.

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LIQUOR ARSENICALIS.	LIQUOR ARSENICI HYDROCHLORICUS.	LIQUOR SODÆ ARSENIATIS.
<i>a.</i> Pale pink colour.	<i>a.</i> Colourless.	<i>a.</i> Colourless.
<i>b.</i> Alkaline reaction.	<i>b.</i> Acid reaction.	<i>b.</i> Alkaline reaction.

IMPURITIES.

1. In *arsenious acid* gypsum and chalk may be present, which do not volatilize with heat.

2. *Arseniate of iron* is liable to contain a sulphate, indicated by the solution in hydrochloric acid diluted giving a white precipitate with chloride of barium.

QUANTITATIVE TESTS.

1. *Arsenious Acid*.—4 grains, dissolved in boiling water with 8 grains of bicarbonate of soda, discharge the colour of 808 grain-measures of *Vol. solution of iodine*.

2. *Arseniate of Iron*.—20 grains dissolved in an excess of hydrochloric acid diluted with water, continue to give a blue precipitate with ferrocyanide of potassium, until at least 170 grain-measures of *Vol. solution of bichromate of potash* have been added = 2.85 grains of iron in the *ferrous* state.

3. *Arseniate of Soda*.—10 grains of the *dried salt*, heated with 53 grain-measures of *Vol. solution of soda*, continue to give a precipitate with *Vol. solution of nitrate of silver* until 1613 grain-measures have been added.

PHARMACY.—1. There are no *official preparations* of arsenic, besides those already considered. It may be remarked, however, that it is frequently given with other medicines, and a special preparation—*Liquor Arsenici et Hydrargyri Hydriodatis* or *Donovan's solution*, was formerly in the Dublin Pharmacopœia.

2. *Incompatibles*.—These are lime-water; magnesia; salts of iron; and astringent matters:

ACTION.—Arsenious acid is a local escharotic. Internally all the preparations of arsenic are alterative; general and nervine tonics; and anti-periodic. They affect the alimentary canal and respiratory passages, being irritant in large doses. Best given *after meals*. Doses—Of *arsenious acid*, gr. $\frac{1}{10}$

to $\frac{1}{12}$; *Liquor Arsenicalis* or *Hydrochloricus*, $\text{m}2$ to 8; *Sodæ Arsenias*, gr. $\frac{1}{16}$ to $\frac{1}{8}$; *Liquor Sodæ Arseniatis*, $\text{m}5$ to 10; *Ferri Arsenias*, gr. $\frac{1}{16}$ to $\frac{1}{4}$. The doses should be very gradually increased, commencing with the smallest.

BISMUTHUM—BISMUTH.

GENERAL SUMMARY.—This group includes:—

1. **Bismuthum**.—The impure metal.
2. **Bismuthum Purificatum**.—Purified bismuth.
3. **Bismuthi Oxidum**—Oxide of Bismuth = Bi_2O_3 .

4. **Salts**

{	<i>a. Bismuthi Carbonas</i> .—Carbonate of Bismuth = $2(\text{Bi}_2\text{CO}_3), \text{H}_2\text{O}$. <i>b. Bismuthi Subnitrates</i> .—White Bismuth = $\text{BiNO}_3, \text{H}_2\text{O}$. (i). <i>Trochisci Bismuthi</i> = gr. 2 of subnitrate in each.
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5. **Liquor Bismuthi et Ammoniae Citratis**.—A mixed solution of citrate of bismuth and citrate of ammonia, with some nitrate of ammonium = gr. 3 of *oxide of bismuth* in 3 i.

SOURCES AND PREPARATION.—This part of the subject may be discussed thus:—

A. From **Purified Bismuth**.

1. **Carbonate**
 2. **Subnitrate**
- } In the earlier part of the process these two compounds of bismuth are prepared in the same way.

a. Add **bismuth**, $\text{z}2$ by { **Nitric acid**, $\text{z}4$.
degrees to { **Water**, $\text{z}3$.



b. When effervescence has ceased, apply heat nearly to the boiling-point for ten minutes, and decant the solution.

c. Evaporate and concentrate to $\frac{3}{2}$.

From this point the preparation of the two salts differs, as follows:—

CARBONATE.	SUBNITRATE.
<i>d.</i> Add the concentrated solution in small quantities at a time to a cold filtered solution of { Carbonate of ammonia , $\frac{3}{6}$ Water , O 2 constantly stirring.	<i>d.</i> Pour the solution into Water = C $\frac{1}{2}$. Subnitrate is precipitated, and supernitrate remains in solution.
$4\text{Bi}\text{NO}_3 + 8\text{N}_4\text{H}_{16}\text{O}_8 = 12\text{NH}_4\text{NO}_3 + 2\text{Bi}_2\text{CO}_3 + 7\text{CO}_2$	$5\text{Bi}\text{NO}_3 + \text{SH}_2\text{O} = 4\text{BiNO}_4, \text{H}_2\text{O} + \text{Bi}\text{NO}_3, 8\text{HNO}_3$
<i>e.</i> Collect the precipitate on a calico-filter; wash until the washings are tasteless; dry, first by slight pressure, and finally at a temperature not exceeding 150° .	<i>e.</i> Decant the fluid; add to the precipitate, Water = C $\frac{1}{2}$; stir well; decant in 2 hours; collect and drain the precipitate on a calico filter; press and dry under 150° .

3. **Liquor Bismuthi et Ammoniae Citratilis.**—

The earlier parts of the process by which this solution is prepared are similar to those of the salts just described, the only difference being in the proportion of ingredients, namely:—

Bismuth, $\frac{3}{3}$ 1 in { **Nitric acid**, $\frac{3}{3}$ 2. **Water**, $\frac{3}{3}$ 1.

The further preparation is as follows:—

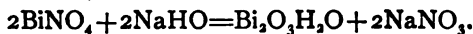
d. Add { **Citric acid**, $\frac{3}{3}$ 2 } to the concentrated **Water**, $\frac{3}{3}$ 4 } solution.

e. Add gradually **solution of ammonia** until the precipitate first formed (Bi_2O_3) is dissolved, and the solution is neutral or slightly alkaline. Dilute to O 1.

(Bi_2O_3 is freely soluble in citrate of ammonia).

B. From Subnitrate.**1. Oxide.**

- a.* Mix $\left\{ \begin{array}{l} \text{Subnitrate of bismuth, lb 1} \\ \text{Solution of soda, O 4} \end{array} \right\}$ and boil for five minutes



- b.* Allow it to cool, and the precipitate to subside.
c. Decant; wash the precipitate to remove nitrate of soda; and dry by the heat of a water-bath.

CHARACTERS AND PROPERTIES.—These are easily summed up thus:—

1. Oxide and Salts $\left\{ \begin{array}{l} \text{Carbonate.} \\ \text{Subnitrate.} \end{array} \right.$

- a.* All powders, the carbonate very fine, the subnitrate in minute crystalline scales.
b. Colour $\left\{ \begin{array}{l} \text{Oxide, dull lemon-yellow.} \\ \text{Carbonate and subnitrate, white.} \end{array} \right.$
c. Insoluble in water or alcohol.
d. Soluble in nitric acid, diluted with half its volume of water, the carbonate with effervescence.
e. Blackened by H_2S .

2. Liquor Bismuthi et Ammoniae Citratis.

- a.* A colourless solution.
b. Neutral or slightly alkaline.
c. Saline and slightly metallic taste.

IMPURITIES.—Lead; chlorides; arsenic; nitrates in the carbonate.

QUANTITATIVE TEST.

Liquor Bismuthi.—Fl. 3 3 mixed with $\frac{3}{4}$ 1 of water, and treated with H_2S in excess, yield a black precipitate, which, when collected, washed, and dried, weighs 9·9 grains.

PHARMACY.—1. Official Preparation:—

Trochisci Bismuthi.—Made in the usual way with

gum, etc., except that **rose-water** is used, each lozenge containing :—

Subnitrate of bismuth, gr. 2.

Carbonate of magnesia, gr. $2\frac{2}{3}$.

Precipitated carbonate of lime, gr. $3\frac{1}{2}$.

2. *Incompatibles*.—The subnitrate is incompatible with the alkalies and their carbonates.

ACTION.—Local sedative and astringent. Cosmetic. Internally, gastric sedative; astringent to alimentary canal; blacken the stools. **Dose**.—Of *oxide* and *salts*, gr. 5 to 15 or 20; *liquor*, $3\frac{1}{2}$ to 1; *trochisci*, 1 to 6.

CUPRUM—COPPER.

GENERAL SUMMARY.—The B. P. only recognizes the following :—

1. **Cuprum—Copper**.—(Copper-wire is used in making Spiritus Ætheris Nitrosi).

2. **Cupri Sulphas—Sulphate of Copper—Bluestone** = $\text{CuSO}_4\cdot 5\text{H}_2\text{O}$.

- | | |
|-------------------------|---|
| 3. In Appendix . | <p>a. <i>Copper-foil</i> = pure metallic copper, thin and bright.</p> <p>b. <i>Anhydrous Sulphate of Copper</i> = CuSO_4.—A yellowish-white powder, which becomes blue when moistened with water.</p> <p>c. <i>Solution of Acetate of Copper</i>—made with subacetate, acetic acid, and water.</p> <p>d. <i>Solution of Ammonio-Sulphate of Copper</i>—made with sulphate of copper, solution of ammonia and water.</p> |
|-------------------------|---|

Cupri Sulphas—Sulphate of Copper.

This is the only preparation that needs to be noticed specially, and the facts relating to it may be given in a tabular form.

SOURCE AND PREPARATION.	CHARACTERS AND PROPERTIES.
By heating copper and sulphuric acid together; dissolving the product in water; and evaporating to crystallization.	a. Large crystals = oblique prismatic.
$\text{Cu} + 2\text{H}_2\text{SO}_4 =$	b. Deep-blue colour; clear.
$\text{CuSO}_4 + 2\text{H}_2\text{O} + \text{SO}_2$	c. Strong styptic, metallic taste.
Also by roasting copper pyrites on a large scale.	d. Soluble in water (1 in 3); in glycerine (1 in 4).
	e. Solution reddens litmus.
	f. Effloresces slightly in air.
	g. Loses water by heat = 400° , becoming anhydrous and white; rapidly absorbs water again, and resumes blue colour.
	h. Liable to contain iron and other impurities.

INCOMPATIBLES.—Alkalies and their carbonates; lime-water; mineral salts (except sulphates); iodides; and most vegetable astringents.

ACTION.—Escharotic. Internal and external astringent. Nervine tonic. Emetic. *Dose.*—gr. $\frac{1}{3}$ to 2; as emetic, gr. 5 to 10.

CADMIUM.

There is only one officinal compound of cadmium, namely, the *Iodide*, which is described under iodine (*see* IODINE).

FERRUM—IRON.

GENERAL SUMMARY.—The official compounds of Iron are very numerous, and their arrangement presents some difficulty, but the following seems the most convenient:—

- | | |
|--------------------------|--|
| 1. Forms of Iron. | { <ul style="list-style-type: none"> a. <i>Iron-wire</i>, soft or wrought. b. <i>Ferrum Redactum</i>—<i>Reduced Iron</i>.
Iron, with a variable amount of magnetic oxide (Fe_3O_4), and sometimes sulphide. |
| 2. Oxides. | { <ul style="list-style-type: none"> a. <i>Ferri Oxidum Magneticum</i> —
Magnetic Oxide of Iron = Fe_3O_4, with some Fe_2O_3, and about 20 per cent. of water. b. <i>Ferri Peroxidum Hydratum</i> —
Hydrated Peroxide of Iron = $\text{Fe}_2\text{O}_3, \text{H}_2\text{O}$. c. <i>Ferri Peroxidum Humidum</i> —
Moist Peroxide of Iron, containing about 86 per cent. of water uncombined. |
| 3. Simple Salts. | { <ul style="list-style-type: none"> a. <i>Ferri Arsenias</i>. (See ARSENIC). b. <i>Ferri Carbonas Saccharata</i> —
Saccharated Carbonate of Iron = FeCO_3, with some Fe_2O_3, mixed with sugar. c. <i>Ferri Iodidum</i>—Iodide of Iron = FeI, with about 18 per cent. of water, and a little FeO. d. <i>Ferri Phosphas</i>—Phosphate of Iron = $\text{Fe}_3\text{P}_2\text{O}_8$. e. <i>Ferri Sulphas</i>—Sulphate of Iron —
Copperas = $\text{FeSO}_4, 7\text{H}_2\text{O}$. f. <i>Ferri Sulphas Exsiccata</i>—Dried Sulphate of Iron = Fe_2SO_4. g. <i>Ferri Sulphas Granulata</i> —
Granulated Sulphate of Iron = $\text{Fe}_2\text{SO}_4, 7\text{H}_2\text{O}$. |

4. **Compound or Scaly Salts.** {
- a. *Ferri et Ammonie Citras*, of uncertain composition.
 - b. *Ferrum Tartaratum*—*Ferri Potassio-Tartras*— $\text{K}_3\text{Fe}(\text{C}_4\text{H}_4\text{O}_6)_3$.
 - c. *Ferri et Quinine Citras*.—Citrate of iron, quinine, and ammonia; the iron being in both the *ferrous* and *ferric* states.
5. **Liquores or Solutions.** {
- a. *Liquor Ferri Perchloridi Fortior*.—Solution of $\text{Fe}_2\text{Cl}_6 = 31.728$ grains in 3 i.
 - b. *Liquor Ferri Perchloridi*.—A diluted solution = 1 to 3.
 - c. *Liquor Ferri Pernitrat*.—Solution of $\text{Fe}_26\text{NO}_3 = 7.865$ grains in 3 i.
 - d. *Liquor Ferri Persulphatis*.
6. **Tinctures.** {
- a. *Tinctura Ferri Perchloridi*.
 - b. *Tinctura Ferri Acetatis*.
7. **Special Official Preparations.** {
- a. *Emplastrum Ferri*; made from Peroxide.
 - b. *Mistura Ferri Aromatica*—*Heberden's Ink*, containing Tannate of Iron; made from Iron-wire.
 - c. *Mistura Ferri Composita*—*Griffith's Mixture*, containing Hydrated Ferrous Carbonate.
 - d. *Pilula Ferri Carbonatis*, gr. 1 in 1 $\frac{1}{4}$.
 - e. „ *Ferri Iodidi*, gr. 1 in 3.
 - f. *Syrupus Ferri Iodidi*, gr. 4 $\frac{1}{8}$ in 3 i.
 - g. „ *Ferri Phosphatis*, gr. 1 in 3 i.
 - h. *Trochisci Ferri Redacti*, gr. 1 in each.
 - i. *Vinum Ferri*, made from Iron-wire.
 - j. „ *Ferri Citratis*, gr. 1 in 3 i.

8. In **Appendix** { *a. Ferri Sulphidum*, FeS; for making H_2S gas.
b. Test-Solution of Sulphate of Iron
 =gr. 10 in $\frac{3}{4}$ i.

SOURCES AND PREPARATION.—The sources of the iron-compounds are as follows:—

1. *Native*—Sulphide.

- | | | | |
|-----------------------|---|--------------------------------------|--|
| 2. From
Iron-Wire. | { | Salts | {
<i>a.</i> Iodide.
<i>b.</i> Sulphate. |
| | | Solutions | {
<i>c.</i> Liquor Ferri Perchloridi Fortior.
<i>d.</i> Liquor Ferri Pernitratiss. |
| | | Special
Officinal
Preparations | {
<i>e.</i> Mistura Ferri Aromatica.
<i>f.</i> Pilula Ferri Iodidi.
<i>g.</i> Syrupus Ferri Iodidi.
<i>h.</i> Vinum Ferri. |

- | | | |
|-------------------|---|--|
| 3. From Sulphate. | { | <i>a.</i> Dried Sulphate. |
| | | <i>b.</i> Granular Sulphate. |
| | | <i>c.</i> Saccharated Carbonate |
| | | <i>d.</i> Arseniate (<i>see</i> ARSENIC). |
| | | <i>e.</i> Phosphate. |
| | | <i>f.</i> Liquor Ferri Persulphatis. |
| | | <i>g.</i> Mistura Ferri Composita. |

- | | | |
|---|---|--|
| 4. From <i>Liquor Ferri Persulphatis</i> .
(In making the scaly preparations, a form of moist peroxide is produced). | { | <i>a.</i> Humid Peroxide.
(i). Hydrated Peroxide from this. |
| | | <i>b.</i> Ferri Ammonio-Citras. |
| | | <i>c.</i> Ferrum Tartaratum. |
| | | <i>d.</i> Ferri et Quiniæ Citras. |
| | | <i>e.</i> Tinctura Ferri Acetatis. |

5. From *Sulphate* and *Liquor Ferri Persulphatis*. { *a.* Magnetic Oxide.
 6. From *Peroxide*. { *a.* Ferrum Redactum.

The actual preparation of the compounds requiring to be described here may be considered according to the following plan:—

A. Ferrum Redactum.—By placing **peroxide of iron** in the middle part of a gun-barrel, heating this in a furnace, and passing through it a stream of **hydrogen gas** until the oxide is thoroughly reduced; then allowing it to cool, the current of hydrogen gas being still continued.

B. Oxides of Iron.

1. Moist Peroxide.

- a.* Add { **Solution of persulphate**, $\frac{3}{4}$ 4
Water, O 1

gradually to **Liquor sodæ**, $\frac{3}{4}$ 33, stirring constantly and briskly; let it stand for two hours, stirring occasionally.



- b.* Collect the precipitate on a calico filter, and wash from sulphate of soda.

- c.* Enclose *without drying* in a stoppered bottle.

2. Hydrated Peroxide.—Dry the **humid peroxide** under 212° , until it ceases to lose weight.

3. Magnetic Oxide.

- a.* Dissolve { **Sulphate of iron**, $\frac{3}{4}$ $\frac{1}{2}$ };
Water, O 2

add **solution of persulphate**, $\frac{3}{4}$ 2;
 mix with **liquor sodæ**, O 4; stir well together; and boil.

- b.* Let it stand 2 hours, stirring occasionally.

- c.* Collect on a calico filter; wash away sulphate of soda; and dry not above 120° .

C. Simple Salts.**1. Saccharated Carbonate.**

- a. Mix { **Sulphate of iron**, $\frac{3}{2}$ } with
 { **Boiling water**, $\frac{1}{2}$ }
 { **Carbonate of ammonia**, $\frac{3}{2}$ }
 { **Boiling water**, $\frac{1}{2}$ }

in a deep cylindrical vessel, briskly stirring.

- b. Cover accurately; set aside for 24 hours; and separate the liquid, by means of a syphon, from the precipitated carbonate of iron.

- c. Pour on more **boiling water** (C1); stir; and repeat the above process.

- d. Collect the precipitate on a calico filter; press; rub with **sugar** = $\frac{3}{2}$ 1, in a porcelain mortar; and dry under 212° .

(*Boiling water* is used to exclude air; and the *sugar* is mixed to preserve the carbonate against oxidation by the air).

2. Iodide. By direct combination.

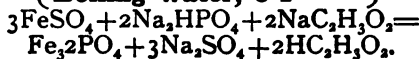
- a. Heat gently { **Iron wire**, $\frac{3}{2}$ } and then boil until
 in a flask for { **Iodine**, $\frac{3}{2}$ } the froth is white.
 10 minutes { **Water**, $\frac{3}{2}$ } (All the I taken up.)

- b. Filter through calico into an iron dish; wash the filter; and boil until a drop taken out on the end of a piece of iron solidifies.

- c. Pour out on a porcelain dish; and break into fragments when solid.

3. Phosphate. By double decomposition.

- a. Mix and stir { **Sulphate of iron**, $\frac{3}{2}$ } with
 carefully { **Boiling water**, $\frac{1}{2}$ }
 { **Phosphate of soda**, $\frac{3}{2}$ }
 { **Acetate of soda**, $\frac{3}{2}$ }
 { **Boiling water**, $\frac{1}{2}$ }



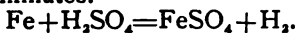
- b.* Separate the precipitate by a calico filter; wash away the sulphate of soda; and dry under 120° (to prevent oxidation).

(The *acetate of soda* is intended to prevent the the liberation of sulphuric acid, which dissolves the phosphate of iron.)

4. *Sulphate*.—By direct action of H_2SO_4 on iron.

- a.* Add **Sulphuric Iron wire, $\frac{3}{4}$**
acid, $\frac{3}{4}$ to **{ Water, $O 1\frac{1}{2}$ }**
 in a porcelain capsule.

When disengagement of H has almost ceased, boil for ten minutes.



- b.* Filter; crystallize; and dry the crystals on filtering paper on porous bricks = $FeSO_4, 7H_2O$.

5. *Dried Sulphate*.—Heat the **sulphate**, beginning at 212° , and raising the temperature to 400° , until aqueous vapour ceases to be given off.

6. *Granulated sulphate*.

- a.* Filter the boiling solution of sulphate of iron (see above), into **rectified spirit, $\frac{3}{8}$** , stirring.

- b.* Decant; and dry the granular crystals on filtering paper on porous bricks, by exposure to the air.

D. Compound { 1. *Ammonio-citrate*.
 or **Scaly Salts** { 2. *Tartarated Iron*.
 { 3. *Citrate of Iron and Quinine*.

These preparations of iron may be considered together, as the earlier and final parts of the process are similar in each case, and this may be conveniently divided into three stages:—

- a.* In the first part of the process a form of moist peroxide of iron is made, by adding gradually diluted **liquor ferri persulphatis** to diluted **liquor ammoniæ**, stirring constantly and briskly;

allowing the mixture to stand for 2 hours, stirring occasionally; washing the precipitated peroxide on a calico filter, to remove sulphate of ammonia; and draining.

The proportions of the ingredients used are different in each case, as follows:—

	LIQUOR FERRI PERSULPHATIS.		LIQUOR AMMONIÆ.	
Ammonio-citrate, Tartarated iron, Citrate of iron and quinine,	$\frac{3}{3}$ 8 $\frac{3}{3}$ 5½ $\frac{3}{3}$ 4½	{ Severally diluted with water, O 2.	$\frac{3}{3}$ 14 $\frac{3}{3}$ 10 $\frac{3}{3}$ 8	{ Severally mixed with water, O 2.

b. The second part of the process is special in each instance, thus:—

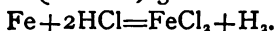
- (i) *Ammonio-citrate*. Add the **iron peroxide** to { **Citric acid**, $\frac{3}{3}$ 4 } heated with a water-bath, stirring until nearly the whole has dissolved. Let the solution cool, and add **liquor ammoniæ**, $\frac{3}{3}$ 5½.
- (ii). *Tartarated iron*. Mix the **peroxide** with **acid tartrate of potash** = $\frac{3}{3}$ 2, in a porcelain dish, and let it stand for 24 hours. Apply heat not above 140°; add gradually **water**=O 1; and stir constantly, until nothing more will dissolve.
- (iii) *Citrate of Iron and Quinine*. Add the **peroxide** to { **Citric acid**, $\frac{3}{3}$ 3 } heated by a water-bath; stir until dissolved; and add **quinine** (previously prepared from $\frac{3}{3}$ 1 of sulphate of quinine). Let the solution cool, and add in small quantities at a time { **Solution of ammonia**, $\frac{3}{3}$ 12 } stirring briskly, and allowing the quinine, which separates with each addition, to dissolve before adding more.

c. The last stage of the process consists in each case of filtering; evaporating to a syrupy consistence; drying in thin layers on flat porcelain or glass plates, at a temperature not exceeding 100° ; removing the salt in flakes; and keeping in a stoppered bottle.

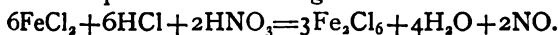
E. Solutions and Tinctures.

1. *Liquor Ferri Perchloridi Fortior.*

- a. Dissolve $\left\{ \begin{array}{l} \text{Iron-wire, } \frac{3}{2} \\ \text{Hydrochloric acid, } \frac{3}{8} \\ \text{Water, } \frac{3}{8} \end{array} \right\}$ by aid of gentle heat.



- b. Filter; add $\left\{ \begin{array}{l} \text{Hydrochloric acid, } \frac{3}{4} \\ \text{Nitric acid, } \frac{3}{9} \end{array} \right\}$; and heat until red fumes are evolved, and the liquid becomes orange-brown.



- c. Evaporate down to $\frac{3}{10}$.

2. *Liquor Ferri Perchloridi* = 1 in 4.

- Mix $\left\{ \begin{array}{l} \text{Strong solution of perchloride, } 1 \\ \text{Water, } 3 \end{array} \right\}$

3. *Tinctura Ferri Perchloridi* = 1 in 4.

- Mix $\left\{ \begin{array}{l} \text{Strong solution of perchloride, } 1 \\ \text{Rectified spirit, } 3 \end{array} \right\}$

4. *Liquor Ferri Pernitratis.*

- a. Dissolve $\left\{ \begin{array}{l} \text{Iron-wire, } \frac{3}{1} \\ \text{Nitric acid, } \frac{3}{4\frac{1}{2}} \\ \text{Water, } \frac{3}{16} \end{array} \right\}$ adding more water, if necessary, to moderate the action.



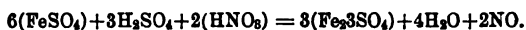
- b. Filter; and add water to O $1\frac{1}{2}$.

5. *Liquor Ferri Persulphatis.*

- a. Dissolve by heat $\left\{ \begin{array}{l} \text{Sulphate of iron, } \frac{3}{8} \\ \text{Sulphuric acid, } \frac{3}{6} \\ \text{Water, } \frac{3}{10} \end{array} \right\}$

- b. Add $\left\{ \begin{array}{l} \text{Nitric acid, } \frac{3}{6} \\ \text{Water, } \frac{3}{2} \end{array} \right\}$

- c. Concentrate by boiling until the colour changes from black to red ; and so long as the solution gives a blue precipitate with red prussiate of potash, add a few drops of nitric acid, and renew the boiling, to convert all the sulphate into persulphate.



(The NO is absorbed by and blackens any *sulphate* present, but this compound is afterwards decomposed.)

- d. When cold, add water to $\frac{3}{4}$ II.

6. *Tinctura Ferri Acetatis.*

- a. Mix in { **Acetate of potash**, 4 } with
a bottle { **Rectified spirit**, 20 }
{ **Solution of persulphate of iron**, 5 }
{ **Rectified spirit**, 16 }
and shake occasionally for an hour.

- b. Filter, and make the filtered liquid up with **rectified spirit** = 40.

CHARACTERS AND PROPERTIES.—The preparations of iron that need to be noticed under this head may be thus grouped:—

A. **Coloured powders.**

1. *Ferrum Redactum.*

- a. A fine and impalpable powder.
b. Greyish-black, but exhibiting metallic streaks when rubbed with firm pressure in a mortar.
c. Strongly attracted by the magnet.
d. Soluble in hydrochloric acid with effervescence, hydrogen gas being evolved.
e. Readily oxidizes if exposed to damp air.

2. *Oxides of Iron.*—The characters and properties of these preparations may be thus indicated:—

SPECIAL.		GENERAL.
Magnetic oxide.	<ul style="list-style-type: none"> <i>a.</i> Brownish-black powder. <i>b.</i> Strongly magnetic. <i>c.</i> Oxidized by heating in air. 	<ul style="list-style-type: none"> <i>a.</i> Tasteless. <i>b.</i> Insoluble in water. <i>c.</i> Soluble in dilute hydrochloric acid, especially the moist peroxide.
Hydrated Peroxide	<ul style="list-style-type: none"> <i>a.</i> Dark-brown or reddish-brown powder. <i>b.</i> Not magnetic. 	
Moist Peroxide	<ul style="list-style-type: none"> <i>a.</i> A moist paste. <i>b.</i> Reddish-brown. 	

3. *Iodide.*

- a.* A crystalline powder.
- b.* Green, with a tinge of brown.
- c.* Inodorous.
- d.* Soluble in water (1 in 1), forming a slightly green solution, very liable to decomposition, with the deposit of peroxide, and liberation of iodine; soluble in alcohol.
- e.* Deliquescent; extremely prone to oxidation.

4. *Phosphate.*

- a.* An amorphous powder.
- b.* Slate-blue colour, but becomes of a green hue by keeping.
- c.* Insoluble in water; soluble in acids.

5. *Dried Sulphate.*

- a.* A powder of greyish cream colour.
- b.* Other characters as the *Sulphate*.

B. **Small lumps or granules.**

1. *Saccharated Carbonate.*

- a.* Small coherent lumps.
- b.* Originally *white*, but rapidly darkens from oxidation, and as usually seen, is of a grey-brown colour.
- c.* Soluble in warm diluted hydrochloric acid, with effervescence.
- d.* Sweet, and very feeble chalybeate taste.

2. *Granulated Sulphate.*

- a. Small granular crystals.
- b. Pale greenish-blue colour.
- c. Other characters as *Sulphate*, but not so liable to become brown.

C. Evident crystals.1. *Sulphate.*

- a. Oblique rhombic prisms.
- b. Pale greenish-blue colour.
- c. Soluble in water (1 in $1\frac{1}{2}$); insoluble in alcohol and proof spirit.
- d. Styptic taste.
- e. Slightly efflorescent.
- f. Crystals and solution become easily oxidised on exposure to air, the former presenting opaque rusty-coloured spots, the latter forming an ochrey deposit.
- g. Heat expels water of crystallization, and then decomposes the salt.

D. Scaly preparations.

These present the common character that they are in thin transparent scales; their *special* characters may be thus tabulated:—

	COLOUR.	SOLUBILITY.	REACTION.	TASTE.
<i>Ammonio-Citrate.</i>	Deep-red.	In water (2 in 1). Almost insoluble in rectified spirit.	Faintly acid.	Slightly sweet and astringent.
<i>Tartarated Iron.</i>	Darker = garnet-red.	In water (1 in 4). Sparingly in spirit.	Neutral.	Somewhat sweet, and rather astringent.
<i>Citrate of Iron and Quinine.</i>	Greenish, golden-yellow; lustrous.	Water (2 in 1). Somewhat deliquescent.	Very slightly acid.	Bitter and chalybeate.

E. Solutions and Tinctures.

With regard to these preparations of iron, it will be sufficient to remember that:—

1. They are all *coloured*, as follows:—

- a. *Liquor Ferri Perchloridi Fortior*, orange-brown.
- b. *Liquor Ferri Perchloridi*, pale brown.
- c. *Tinctura Ferri Perchloridi*, light brown.
- d. *Liquor Ferri Pernitratis*, reddish-brown.
- e. *Liquor Ferri Persulphatis*, dark brown.
- f. *Tinctura Ferri Acetatis*, deep brown.

2. They have a more or less astringent taste, especially the perchloride and persulphate, which are highly styptic. The acetate is very palatable.

IMPURITIES.—The impurities liable to occur in the iron-compounds may be thus summarized:—

1. The *ferric* preparations may contain *ferrous oxide*.

2. *Ferrous* salts are very liable to become oxidized, and to contain *ferric oxide*.

3. *Sulphate* may be present in the *saccharated carbonate* and *hydrated peroxide*.

4. *Arsenic* may be present in the *phosphate*; and *copper* in the *sulphate*.

QUANTITATIVE TESTS.

1. **Remains after incineration = peroxide of iron.**

a. *Moist peroxide* = about 12 per cent.

b. *Ammonio-citrate* = not less than 27 per cent., and not alkaline to litmus.

c. *Citrate of quinine and iron* = oxide of iron, which yields nothing to water.

d. *Tartarated iron*, 50 grains incinerated at a red heat, the product washed with water and again incinerated = 15 grains.

e. *Liquor Ferri Perchloridi Fortior*, 31 diluted with water, $\frac{3}{2}$ { treated with excess of solution of ammonia, give a precipitate which, when washed, dried, and

f. *Liquor Ferri Pernitratis*, $\frac{3}{1}$ { incinerated = 15.62 gr. and 2.6 gr. respectively.

2. Quantitative test for protosalt of iron.

This test is employed to determine the quantity of protosalt in certain compounds of iron. It consists in dissolving the compound in hydrochloric acid; diluting with water; and observing how many grain-measures of *Vol. solution of bichromate of potash* are required to convert the protoxide into peroxide, so that it ceases to give a blue precipitate with red prussiate of potash. In the B.P. this test is applied to the following:—

Twenty grains of	Grain-measures of Vol. solution of Bichromate of Potash.
(i) Magnetic oxide	= 208
(ii) Saccharated Carbonate . .	= 230
(iii) Phosphate	= 250

3. **Quantitative test for quinine** in citrate of iron and quinine = 50 grains dissolved in $\frac{3}{4}$ of water, and treated with slight excess of ammonia, give a white precipitate, which, when collected and dried = 8 grains (Quinia).

PHARMACY.—I. *Official Preparations.* Some of these are of special importance, and these will be first considered.

a. *Mistura Ferri Aromatica* = intense brown.

(i) Macerate for three days in a closed vessel, agitating occasionally, and then filter,

{	Iron-wire, 2.
{	Powdered pale cinchona bark, 4
{	Powdered calumba, 2.
{	Bruised cloves, 1.
{	Peppermint water, 50.

(ii) Add { Tincture of orange-peel, 2.
Compound tincture of cardamoms, 12.

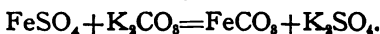
(iii) Make up with peppermint water = 64.

b. *Mistura Ferri Composita* = bluish-green; opaque.

(i) Triturate to form a thin paste { Powdered myrrh, gr. 60.
Refined Sugar, gr. 60.
Carbonate of potash, gr. 30.
Rose water, a sufficiency.

(ii) Gradually add, { Spirit of nutmeg, 3 4.
continuing the trituration, { Rose water, about 3 8.

(iii) Dissolve { Sulphate of iron, gr. 25
Rose water, remainder } and add,
of, 3 9½
mixing well, and corking the bottle immediately.



(Excess of *carbonate of potash* forms with *myrrh* a saponaceous compound, which suspends the *carbonate of iron* formed. The mixture is very liable to decomposition, but the *sugar* retards this. It should be recently prepared.)

c. Pilula Ferri Iodidi = 1 in about 3½.

(i) Agitate in a { Iron-wire, gr. 40 } until the froth
strong stoppered { Iodine, gr. 80 } becomes
ounce-phial { Water, m 50 } white.

(ii) Pour the fluid upon refined sugar, gr. 70
in a mortar; rub briskly; and gradually add
powdered liquorice root, gr. 140.

d. Syrupus Ferri Iodidi = nearly gr. 4½ in 3 i.
Colourless if kept in well-filled bottles.

(i) Digest in { Iron-wire, 1 } and shake together
a flask, at a { Iodine, 2 } until the froth be-
gentle heat { Water, 3 } comes white.

(ii) Filter { Refined Sugar, 28 } Mix; and make
while hot into { Water, 10. } up with water to
hot syrup = { measure, 3 i½.

(This preparation is best preserved by *suspend-
ing a coil of iron-wire* in the bottle containing it.
As iodine is set free, it combines with the iron).

e. Syrupus Ferri Phosphatis = about gr. 1 in 3 i.
Colourless when fresh; becomes brown, and de-
posits on keeping.

(i) Mix, care- { Granulated sulphate of iron, gr. 224
fully stirring { Water, 3 3.
with { Phosphate of soda, gr. 200.
{ Acetate of soda, gr. 74.
{ Water, 3 4.

(ii) Wash the precipitate on a calico filter with water, from sulphate of soda.

(iii) Press it strongly between folds of bibulous paper; and add diluted phosphoric acid, $\frac{3}{4}$ 5½.

(iv) Filter the solution; add sugar, $\frac{3}{4}$ 8; and dissolve without heat.

The remaining officinal preparations of iron are much more simple in their manufacture, and may be taken in alphabetical order:—

f. Emplastrum Ferri.

Melt { Burgundy pitch, 2 } and stir in
 { Lead plaster, 8 } peroxide of iron, 1.

g. Pilula Ferri Carbonatis.

Mix { Saccharated carbonate, 4.
 { Confection of roses, 1.

h. Trochisci Ferri Redacti—gr. 1 in each. Iron-grey. Made in the usual way with sugar, gum, etc.

i. Vinum Ferri. Intense olive-brown.

Digest for 30 days, with frequent agitation, the bottle being { Fine iron-wire, $\frac{3}{4}$ 1 } The wire must
 uncorked after { Sherry wine, $\frac{3}{4}$ 20. } not be wholly
 each agitation, } immersed.

j. Vinum Ferri Citratis. Deep-brown—gr. 1 in $\frac{3}{4}$ 1.

Dissolve and { Citrate of iron and ammonia,
 filter after three } gr. 160
 days { Orange wine, $\frac{3}{4}$ 20.

2. The other preparations in connection with which iron or its compounds are pharmaceutically employed, are as follows:—

a. Iron is used in separating mercury.

b. Sulphide is one of the sources of sulphur.

c. Sulphate is contained in Pil. Aloes et Ferri.

3. *Incompatibles.*—These may be indicated thus:—

a. All the preparations of iron are chemically incompatible with tannic and gallic acids, and vegetable astringents containing them. They are, however, sometimes administered together.

b. There are certain *special* incompatibles of particular preparations, namely:—

Saccharated Carbonate.—Acids and acidulous salts.

Iodide.—Acids and acidulous salts; alkalies and their carbonates; lime-water.

Solutions and Tincture of Perchloride.—Alkalies, lime-water, magnesia, and their carbonates; mucilage decomposes them.

Ammonio-Citrate.—Mineral acids; fixed alkalies.

Tartarated Iron.—Mineral acids; lime-water.

Citrate of Quinine and Iron.—Alkalies and their carbonates.

ACTION.—The action of the preparations of iron may be thus summarized:—

1. All the *solutions of persalts* and the *tincture of perchloride* are powerful external and local astringents and styptics.

Emplastrum Ferri is a useful strengthening plaster.

2. Almost all the preparations of iron may be used as hæmatinics or blood-restorers; and general tonics. Some are useful nervine tonics.

3. Several of the preparations are internal astringents, especially those of the *persalts* and the *sulphate*.

4. *Hydrated peroxide* is used as an antidote in poisoning by arsenic.

5. Certain preparations, namely, the *arseniate*, *iodide*, and *citrate of quinine and iron*, have special actions, due to their several special ingredients.

Doses.—Of *Reduced Iron*, gr. 2 to 6; *Trochisci*, 1 to 6.

Magnetic Oxide, gr. 5 to 10.

Hydrated Peroxide, gr. 5 to 30. *Humid Peroxide*, 3 2 to 4.

Saccharated Carbonate or Pill, gr. 5 to 20.

Iodide, gr. 1 to 5; *Pill*, gr. 3 to 8; *Syrup*, ℥ 20 to 60.

Phosphate, gr. 5 to 10; *Syrup*, 3 i to 4.

Sulphate, gr. 1 to 5; *Dried*, gr. $\frac{1}{2}$ to 3; *Granulated*, gr. 3 to 5.

Tartarated Iron

Ammonio-Citrate

Citrate of Quinine and Iron

} gr. 5 to 10.

Solution or Tincture of Perchloride, ℥ 10 to 30.

Solution of Permanganate, ℥ 10 to 40.

Tincture of Acetate, ℥ 5 to 30.

Mistura Ferri Composita

Mistura Ferri Aromatica

} 3 i to 2.

Vinum Ferri

Vinum Ferri Citratis

} 3 i to 4.

HYDRARGYRUM—MERCURY.

GENERAL SUMMARY.—The preparations of mercury may be arranged thus:—

1. **Hydrargyrum**—Metallic Mercury.
2. **Allotropic Forms of Oxide**=HgO.
 - a. *Hydrargyri Oxidum Flavum*—Yellow Oxide of Mercury.
 - b. *Hydrargyri Oxidum Rubrum*—Red Oxide of Mercury—Red Precipitate.
3. **Salts.**
 - a. *Hydrargyri Subchloridum*—Calomel = HgCl.
 - b. *Hydrargyri Perchloridum*—Corrosive Sublimate=HgCl₂.
 - c. *Hydrargyri Iodidum Viride*—Green Iodide of Mercury = HgI.
 - d. *Hydrargyri Iodidum Rubrum*—Red Iodide of Mercury = HgI₂.
 - e. *Hydrargyri Sulphas*—Sulphate of Mercury = HgSO₄.
 - f. *Hydrargyrum Ammoniatum*—Ammoniated Mercury—White Precipitate = NH₂HgCl.
4. **Official Preparations containing finely-divided Mercury.**
 - For internal use.
 - a. *Hydrargyrum cum Creta*—Grey powder=gr. 1 in 3.
 - b. *Pilula Hydrargyri*—Blue pill = gr. 1 in 3.
 - For external use.
 - c. *Emplastrum Hydrargyri*.
 - d. *Emplastrum Ammoniaci cum Hydrargyro*.
 - e. *Linimentum Hydrargyri*.
 - f. *Unguentum Hydrargyri*.
 - g. *Unguentum Hydrargyri Compositum*—Scott's Ointment.
 - h. *Suppositoria Hydrargyri*. Each contains gr. 5 of *Unguentum Hydrargyri*.

**5. Special
Official
Preparations.**

- a. *Liquor Hydrargyri Nitratis Acidus*
—Solution of Acid Nitrate of
of Mercury. — Solution of
 Hg_2NO_3 in Nitric Acid.
- b. *Liquor Hydrargyri Perchloridi*—
Solution of Perchloride of
Mercury = gr. $\frac{1}{2}$ in $\frac{3}{4}$ 1.
- c. *Lotio Hydrargyri Flava*—Yellow
Wash.—A precipitate of Hg_2O
with lime-water.
- d. *Lotio Hydrargyri Nigra*—Black
Wash.—A precipitate of Hg_2O
with lime-water.
- e. *Pilula Hydrargyri Subchloridi
Composita*—Compound Pill of
Calomel.—Plummer's pill =
gr. 1 of Calomel in 5.
- f. *Unguentum Hydrargyri Oxidi
Rubri.*
- g. *Unguentum Hydrargyri Ammoniati.*
- h. *Unguentum Hydrargyri Iodidi
Rubri.*
- i. *Unguentum Hydrargyri Nitratis*—
Citrine Ointment.
- j. *Unguentum Hydrargyri Subchloridi.*

SOURCES AND PREPARATION. — The sources of mercury and its primary preparations may be thus tabulated:—

1. From *Native Sulphide* } Mercury.
or *Cinnabar*.
2. From *Mercury*.
(In addition to Official
Preparations).
 - a. Red Oxide.
 - b. Green Iodide.
 - c. Sulphate.
3. From *Sulphate*.
 - a. Perchloride or Corro-
sive Sublimite.
 - b. Subchloride or Calomel.

4. From *Perchloride*. $\left\{ \begin{array}{l} a. \text{ Yellow Oxide.} \\ b. \text{ Red Iodide.} \\ c. \text{ Ammoniated Mercury.} \end{array} \right.$

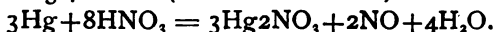
Their actual preparation may be considered according to the following plan:—

A. **Hydrargyrum — Mercury.** — Distil the **sulphide** (cinnabar) with **iron**. The vapour of mercury is condensed. It is purified by redistillation, and washing with dilute hydrochloric acid.

B. **Oxides of Mercury.**

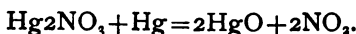
1. *Red or Nitric Oxide.*

- a. Dissolve $\left\{ \begin{array}{l} \text{Nitric acid, } \frac{3}{4} \\ \text{mercury, } \frac{1}{2} \end{array} \right.$ and evaporate to dryness. $\left\{ \begin{array}{l} \text{Water, } \frac{3}{2} \\ \text{in } \frac{3}{4} \end{array} \right.$



- b. Thoroughly triturate with **mercury** = $\frac{3}{4}$.

- c. Heat in a porcelain dish, with repeated stirring, until acid vapours cease to be evolved.

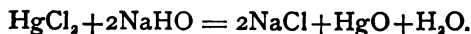


(The *mercury* saves waste of oxygen).

2. *Yellow Oxide.*

- a. Dissolve by $\left\{ \begin{array}{l} \text{Perchloride of mercury, } \frac{3}{4} \\ \text{aid of heat } \left\{ \begin{array}{l} \text{Water, } 0 \\ \text{ } \end{array} \right. \frac{4}{4} \end{array} \right.$

- b. Add this solution to **liquor sodæ** = 0 2, and stir.



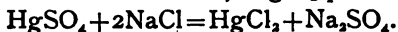
- c. After subsidence, decant the liquid; wash the precipitate thoroughly on a calico-filter; and dry by the heat of a water-bath.

C. **Salts of Mercury.**

1. *Perchloride—Corrosive Sublimate.*

- a. Mix in a $\left\{ \begin{array}{l} \text{Sulphate of mercury, } 20 \\ \text{mortar finely } \left\{ \begin{array}{l} \text{Dried chloride of sodium, } 16 \\ \text{powdered } \left\{ \begin{array}{l} \text{Black oxide of manganese, } 1 \end{array} \right. \end{array} \right. \end{array} \right.$

b. *Sublime* this mixture; HgCl_2 passes over.



(The MnO_2 prevents the formation of any calomel= HgCl , by setting free some Cl from the NaCl).

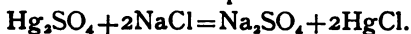
2. *Subchloride—Calomel.*

a. Rub together { **Moistened sulphate of mercury,** $\frac{3}{3}$ 10.
until no globules are visible { **Mercury,** $\frac{3}{3}$ 7.

Hg_2SO_4 is formed.

b. Add dried **chloride of sodium** = $\frac{3}{3}$ 5, and thoroughly mix.

c. *Sublime* into a large chamber, so as to get the calomel in fine powder.



d. Wash with boiling water from HgCl_2 , until the washings are not darkened by ammonium sulphide; dry under 212° .

3. *Green Iodide.*—By *direct combination* of iodine and mercury.

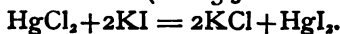
a. Rub in a mortar { **Iodine,** gr. 278 } occasion-
ally moistening with **rectified spirit**, until metallic globules are no longer seen, and the whole becomes green.

b. Dry in a dark room, on filtering paper, by exposure to air. Keep in opaque bottles.

(The *rectified spirit* dissolves the iodine and aids the combination; and by evaporation moderates the temperature).

4. *Red Iodide.*—By *precipitation* from solution of perchloride by iodide of potassium.

a. Mix *boiling* { **Perchloride of mercury,**
aqueous solutions of { $\frac{3}{3}$ 4 in O 3.
Iodide of potassium,
 $\frac{3}{3}$ 5 in O 1.



- b. When cooled to the temperature of the air, decant; collect the precipitate on a filter; wash with cold water; and dry under 212° .

5. *Sulphate*.—By *direct combination*.

Heat $\left\{ \begin{array}{l} \text{Mercury, } \frac{3}{20} \\ \text{Sulphuric acid, } \frac{3}{12} \end{array} \right\}$ in a porcelain vessel, stirring constantly until the mercury disappears; then heat further until a white dry salt remains— $\text{Hg} + 2\text{H}_2\text{SO}_4 = \text{HgSO}_4 + \text{SO}_2 + 2\text{H}_2\text{O}$.

6. *Ammoniated Mercury*.

- a. Dissolve $\left\{ \begin{array}{l} \text{Perchloride of mercury, } \frac{3}{3} \\ \text{Water, } 0 \frac{3}{4} \end{array} \right\}$ by aid of moderate heat; and *mix with liquor ammoniæ*, $\frac{3}{4}$, constantly stirring.



- b. Collect the precipitate on a filter; wash with cold water until no NH_4Cl passes through; and dry under 212° .

(If liquor ammoniæ be *added to* the solution of perchloride, a different compound is formed).

CHARACTERS AND PROPERTIES.—All the mercury compounds have one property in common, namely, that they are entirely *volatilized and sublimed by heat*, or in certain cases they are decomposed. Excluding mercury itself, the other characters of those compounds which need to be noticed here, may be thus arranged:—

1. *Oxides*.—The two officinal oxides of mercury are *chemically* the same, the difference being only *physical*, and they present the following characters in common:—

- a. Insoluble in water.
- b. Soluble in hydrochloric acid.
- c. Decomposed by heat into O and Hg.

The properties in which they differ, may be thus indicated:—

RED OXIDE.

a. Orange-red, crystalline scales.

b. Not affected by cold oxalic acid.

YELLOW OXIDE.

a. Yellow powder.

b. Forms an oxalate with cold oxalic acid.

2. **Chlorides.**—It will be useful to contrast the two chlorides, the one character they have in common being that they are both *heavy*.

CALOMEL.

a. A dull-white powder; liable to become fawn-coloured by action of light.

b. Almost tasteless.

c. Insoluble in water, rectified spirit, or ether.

CORROSIVE SUBLIMATE.

a. In masses of prismatic crystals; colourless.

b. Acrid, metallic taste.

c. Soluble in water (1 in 19); boiling water (1 in 3); rectified spirit (1 in 5); ether (1 in 6).

d. The watery solution reddens litmus; and is liable to decompose, calomel being deposited.

3. **Iodides.**—These may also be contrasted in a tabular form:—

GREEN IODIDE.

a. A dull-green or greenish-yellow powder. Darkens on exposure to light, and after a time minute red specks are seen pervading the mass = HgI_2 .

b. Insoluble in water, alcohol, or ether.

c. Heated gradually in a test-tube, a yellow sublimate forms = HgI_2 , which becomes red on friction or cooling, while Hg remains at the bottom of the tube. Heated rapidly, it sublimes unchanged.

RED IODIDE.

a. A *crystalline* powder, of a vermilion colour. Crystals are octahedra. Not liable to change with light.

b. Almost insoluble in water; sparingly soluble in alcohol; freely in ether, and in solution of iodide of potassium.

c. Heated gently on a sheet of paper over a spirit-lamp, it becomes yellow (crystals = rhomboidal prisms), resuming its scarlet colour on cooling. Sublimes at a heat below redness.

4. **Sulphate.**

- a. A crystalline powder.
- b. White, but made yellow by affusion with water = *Oxysulphate* or *Turpeth Mineral*.
- c. Heavy.

5. **Ammoniated Mercury.**

- a. An amorphous powder, or sometimes made into small spiral cones.
- b. White and opaque.
- c. Unpleasant metallic taste.
- d. Insoluble in water, alcohol, or ether; soluble in hydrochloric acid.
- e. Entirely volatilized by heat below redness.
- f. Digested with caustic potash, it evolves ammonia.

IMPURITIES.—As recognized in the B.P., the only important impurities are the presence of *mercuric* in *mercurous* salts as follows:—

- 1. *HgI₂*, in the green iodide, indicated by:—

- (i) Solubility in ether.

- (ii) Gives a magenta colour with aniline at a boiling heat.

2. *HgCl₂*, in *Calomel*. Warm ether shaken up with it in a bottle, leaves a residue on evaporation = corrosive sublimate.

PHARMACY.—1. *Officinal Preparations.*

These may conveniently be considered under three groups:—

A. **Preparations containing free Mercury.**

a. *Emplastrum Hydrargyri* = Blue.

- (i) Add sublimed sulphur, gr. 6 gradually to heated olive oil, 3 1, stirring till they unite.

- (ii) Add mercury, 3 3, and triturate till its globules disappear.

- (iii) Add to the mixture lead plaster, 3 6, previously liquefied, and mix thoroughly.

b. *Emplastrum Ammoniaci cum Hydrargyro* = Brownish lead colour. Made in the same way

as Emplastrum Hydrargyri, except that instead of lead plaster, ammoniacum, $\frac{3}{4}$ 12, previously liquefied, is finally added.

c. *Linimentum Hydrargyri* = Lead-coloured cream. Melt ointment of mercury in an equal quantity of liniment of camphor; gradually add an equal quantity of solution of ammonia, and shake well together. *Mercury* = 1 in 6.

d. *Pilula Hydrargyri* = Blue.

- (i) Rub $\left\{ \begin{array}{l} \text{Mercury, 2} \\ \text{Confection of roses, 3} \end{array} \right\}$ until globules are no longer visible.
- (ii) Add powdered liquorice = 1, and mix well.

e. *Suppositoria Hydrargyri*.

- (i) Melt together $\left\{ \begin{array}{l} \text{Benzoated lard, gr. 20.} \\ \text{White wax, gr. 20.} \\ \text{Oil of theobroma, gr. 80.} \end{array} \right.$

(ii) Add ointment of mercury, gr. 60; stir till well mixed; and immediately pour into moulds = gr. 15 each.

Mercurial ointment = gr. 5 in each suppository.

f. *Unguentum Hydrargyri* = Lead colour.

Rub to- $\left\{ \begin{array}{l} \text{Mercury, 16} \\ \text{Prepared lard, 16} \\ \text{Prepared suet, 1} \end{array} \right\}$ until metallic globules cease to be visible.

g. *Unguentum Hydrargyri Compositum* = Lead colour.

- (i) Melt yellow wax, 3, and add olive oil, 3.
- (ii) When the mixture is nearly cold,
- add $\left\{ \begin{array}{l} \text{Powdered camphor, } 1\frac{1}{2} \\ \text{Ointment of mercury, 6} \end{array} \right\}$ and mix.

h. *Hydrargyrum cum Creta* = Grey.

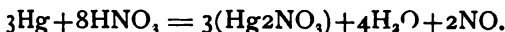
Triturate till all $\left\{ \begin{array}{l} \text{Mercury, 1} \\ \text{Prepared chalk, 2.} \end{array} \right.$ globules disappear

Mercury = 1 in 3.

B. Preparations made from Mercury.

a. *Liquor Hydrargyri Nitratis Acidus* = Colourless; strongly acid.

(i) Dissolve { Nitric acid, $\frac{3}{4}$ }
mercury, $\frac{3}{4}$ in { Water, $\frac{1}{2}$ } without heat.



(ii) Boil gently for 15 minutes, (to ensure the formation of pernitrate, and to expel NO); cool and preserve in a stoppered bottle.

b. *Unguentum Hydrargyri Nitratis* = Lemon-colour.

(i) Dissolve { Mercury, 4 }
 { Nitric acid, 12 } by gentle heat.

(ii) Melt by { Prepared lard, 15 } in a large
water-bath { Olive oil, 32. } porcelain vessel.

(iii) Add the solution of mercury while hot, and mix thoroughly. Heat if necessary, until it froths up, and stir while cooling.

C. Preparations of Compounds of Mercury.

a. *Liquor Hydrargyri Perchloridi* = Colourless.

Contains gr. $\frac{1}{8}$ th in 3 i.

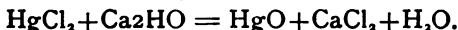
Dissolve { Corrosive sublimate, gr. 10.
 { Chloride of ammonium, gr. 10.
 { Water, $\frac{3}{4}$ 20.

The *chloride of ammonium* aids solution.

b. *Lotio Hydrargyri Flava*.

Mix { Corrosive sublimate, gr. 10.
 { Lime-water, $\frac{3}{4}$ 10.

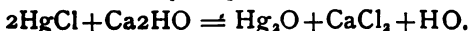
The *yellow oxide* is precipitated.



c. *Lotio Hydrargyri Nigra*.

Mix { Calomel, gr. 3.
 { Lime-water, $\frac{3}{4}$ 1.

The *black oxide* is precipitated.



d. *Pilula Hydrargyri Subchloridi Composita* = Bright-orange. Contains gr. 1 in 5.

Mix $\left\{ \begin{array}{l} \text{Calomel, 1.} \\ \text{Sulphurated antimony, 1} \\ \text{Powdered guaiacum, 2} \\ \text{Castor oil, 1} \end{array} \right.$

e. *Unguenta*.—There are four special ointments of mercurial compounds, which may be thus arranged in alphabetical order :—

(i) *Unguentum Hydrargyri Ammoniati*. Mix $\left\{ \begin{array}{l} \text{Ammoniated mercury,} \\ \text{gr. 62.} \\ \text{Simple ointment, } \frac{3}{4} \text{ i.} \end{array} \right.$

(ii) *Unguentum Hydrargyri Iodidi Rubri*. Mix $\left\{ \begin{array}{l} \text{Red iodide, finely} \\ \text{powdered, gr. 16.} \\ \text{Simple ointment, } \frac{3}{4} \text{ i.} \end{array} \right.$

(iii) *Unguentum Hydrargyri Oxidi Rubri*. Add oil of almonds, $\frac{3}{4}$ to melted yellow-wax, $\frac{3}{4}$. When nearly cold, mix red oxide of mercury, in very fine powder, gr. 62.

(iv) *Unguentum Hydrargyri Subchloridi*. Mix $\left\{ \begin{array}{l} \text{Calomel, gr. 80.} \\ \text{Prepared lard, } \frac{3}{4} \text{ i.} \end{array} \right.$

2. *Incompatibles*.—The only preparations that require special notice in relation to this point are as follows :—

a. *Grey powder*.—Acids and acidulous salts.

b. *Calomel*.—Solutions of potash, soda, and lime; iodide of potassium; nitro-hydrochloric acid; hydrocyanic acid.

c. *Corrosive sublimate*.—Alkalies and their carbonates; lime-water; soaps; iodide of potassium (but often given together); tartar emetic; acetate of lead; nitrate of silver; albumen; decoction of bark.

ACTION.—The effects produced by mercury and its preparations and compounds may be briefly described according to the following plan :—

1. Internally they all increase secretions, and are sialagogue ; purgative, several being powerful intestinal stimulants or irritants ; cholagogue, calomel, however, being said only to be a bile-expellent, corrosive sublimate a hepatic stimulant ; diuretic ; diaphoretic ; and alterative, having a specific action in syphilis. They are liable to produce more or less serious effects—mercurial salivation, etc.

2. Several preparations, if applied externally, especially by inunction or fumigation, produce the special systemic effects of mercury ; and also have a local alterative effect.

3. Some preparations of mercury are used for particular local effects, namely :—

a. Acid nitrate.—Powerful caustic.

b. Red oxide.—Slight caustic.

c. Corrosive Sublimate.—Used as a weak gargle in ulcerated sore-throat.

d. Ammoniated mercury ointment, and solution of corrosive sublimate are employed to destroy pediculi.

Doses—The doses of the preparations of mercury used internally are as follows :—

Blue pill, gr. 3 to 8 or 10.

Grey powder, gr. 3 to 8.

Calomel, gr. $\frac{1}{4}$ to 1 as alterative ; gr. 2 to 8 as purgative ; *Compound pill*, gr. 5 to 10.

Corrosive sublimate, gr. $\frac{1}{16}$ to $\frac{1}{8}$; *Solution*, m₃₀ to 120.

Green iodide, gr. 1 to 3

Red iodide, gr. $\frac{1}{16}$ to $\frac{1}{4}$.

PLUMBUM—LEAD.

GENERAL SUMMARY.—The compounds of lead are:—

1. **Plumbi Oxidum.**—Oxide of Lead—Litharge = PbO .

2. **Salts.** {
 a. *Plumbi Carbonas.*—Carbonate of Lead—White Lead = $2\text{PbCO}_3\text{PbO}, \text{H}_2\text{O}$.
 b. *Plumbi Acetas.*—Acetate of Lead—Sugar of Lead = $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2, 3\text{H}_2\text{O}$.
 c. *Plumbi Iodidum.*—Iodide of Lead = PbI_2 .
 d. *Plumbi Nitras.*—Nitrate of Lead = $\text{Pb}(\text{NO}_3)_2$.

3. **Liquores or Solutions.** {
 a. *Liquor Plumbi Subacetatis.*—Solution of Subacetate of Lead—Goulard Extract = $\text{Pb}_2\text{OC}_2\text{H}_3\text{O}_2$.
 b. *Liquor Plumbi Subacetatis Dilutus.*—Goulard water. A diluted solution of the above.

4. **Special Official preparations.** {
 a. *Emplastrum Plumbi.*
 b. " *Plumbi Iodidi.*
 c. *Pilula Plumbi cum Opio.*
 d. *Suppositoria Plumbi cum Opio.*
 e. *Unguentum Plumbi Acetatis.*
 f. " " *Carbonatis.*
 g. " " *Iodidi.*
 h. " " *Subacetatis Compositum.*

SOURCES AND PREPARATION.—This part of the subject may be described thus :—

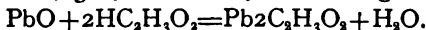
A. From **lead**.

1. *Oxide*.—By roasting **lead** in a current of air.
2. *Carbonate*.—By exposing **sheets of lead** to the fumes of **acetic** and **carbonic acids**, evolved from spent tan, vinegar, decaying organic matter, etc.

B. From **oxide**.

1. *Acetate*.—By *solution*.

- a. Dissolve **oxide** { **Acetic acid**, O 2 } with aid of **of lead**, $\frac{3}{4}$ in { **Water**, O 1 } gentle heat.

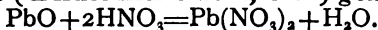


- b. Filter; evaporate; and crystallize, adding acetic acid, if the fluid is not distinctly acid.

- c. Dry on filtering paper, without heat.

2. *Nitrate*.—By *solution*.

- a. Dis- { **Oxide of lead**, $\frac{3}{4}$ } by aid of solve { **Dilute nitric acid**, O 1 } gentle heat.



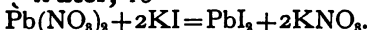
- b. Filter and crystallize.

C. From **nitrate**.

1. *Iodide*. By *double decomposition*.

- a. Mix { **Nitrate of lead**, 4 } dissolved with heat, { **Water**, 30 }

with { **Iodide of Potassium**, 4. { **Water**, 10 }



- b. Collect the precipitate on a filter; wash from nitrate of potash; and dry with a gentle heat.

D. From **acetate** and **oxide**.

1. *Liquor Plumbi Subacetatis*.

- a. Boil { **Acetate of lead**, 5 } constantly for half { **Powdered oxide of lead**, $3\frac{1}{2}$ } stirring. an hour { **Water**, 20 }

- b. Filter; and make up to 20.

CHARACTERS AND PROPERTIES.—Each of the compounds of lead must be considered separately under this head.

1. Oxide.

- a.* In heavy scales.
- b.* Pale brick-red colour.
- c.* Insoluble in water; soluble in diluted nitric and acetic acids, without effervescence; also in lime-water, and the caustic alkalies.
- d.* Decomposes neutral fats, forming an insoluble soap.

2. Carbonate.

- a.* A soft heavy powder.
- b.* White in colour.
- c.* Insoluble in water; soluble, with effervescence, in dilute nitric and acetic acids.
- d.* Blackened by H_2S .

3. Acetate—Sugar of Lead.

- a.* Usually in masses of interlaced acicular crystals.
- b.* White and opaque.
- c.* Moderately heavy.
- d.* Marked acetous odour.
- e.* Sweet and astringent taste.
- f.* Soluble in water (10 in 25); also in alcohol.
- g.* The aqueous solution slightly reddens litmus; is clear, or only slightly turbid, and becomes clear on the addition of acetic acid; and does not form an opaque white jelly with gum mucilage.
- h.* Slightly efflorescent; small crystals may be seen on the inside of the containing bottle.

4. Nitrate.

- a.* In crystals=octahedra.
- b.* Colourless, and nearly opaque.
- c.* Soluble in water and alcohol.
- d.* Sweetish and astringent taste.

5. Iodide.

- a.* In powder; bright yellow.
- b.* Tasteless and odourless.
- c.* Sparingly soluble in cold water; entirely in boiling water, and deposited on cooling in golden crystalline scales; also in alcohol, solution of potash, and alkaline iodides.
- d.* Fuses with moderate heat; decomposed at a high temperature, violet vapours being evolved.

6. Liquor Plumbi Acetatis.

- a.* A clear and colourless solution.
- b.* Alkaline reaction.
- c.* Sweet and astringent taste.
- d.* Becomes opaque on exposure, from absorption of CO_2 .
- e.* Forms with gum mucilage an opaque white jelly.

IMPURITIES. — Those requiring special notice are: —

Oxide = Copper and Iron.

Carbonate = Lime.

QUANTITATIVE TESTS.

Grain-measures
of Vol. solution
of oxalic acid.

- | | |
|--|----------|
| 1. <i>Acetate</i> —gr. 38, dissolved in water, requires for complete precipitation | } = 200. |
| 2. <i>Liquor Plumbi Subacetatis</i> , fl 3 6 or 413·3 grains | |
| | } = 810. |

PHARMACY.—1. Official Preparations.

a. Emplastrum Plumbi. Pale yellow.

Boil together gently by a steam-bath, and simmer for four or five hours, stirring until of proper consistence { Powdered oxide of lead, 1.
Olive oil, $2\frac{1}{2}$.
Water, 1 or more.

b. Emplastrum Plumbi Iodidi. Pale orange.

Melt { Soap plaster, 4 } and mix { Powdered iodide
 { Resin plaster, 4 } intimately { of lead, 1.

c. Liquor Plumbi Subacetatis Dilutus. Slightly opaque.

Mix and { Solution of subacetate of lead, 1.
 filter { Rectified spirit, 1.
 { Water, 78.

d. Pilula Plumbi cum Opio.

Mix { Acetate of lead, in fine powder, 6 } gr. 1 of
 { Opium, in fine powder, 1 } opium in
 { Confection of roses, 1 } 8 grains.

e. Suppositoria Plumbi cum Opio.

Made with { Benzoated lard
 { White wax
 { Oil of theobroma } into 15-grain sup-

positories, each containing { Acetate of lead, gr. 3.
 { Opium, gr. 1.

f. Unguenta.—These include:—

(i) *Unguentum Plumbi Acetatis.* { Acetate of lead, gr. 12.
 { Benzoated lard, $\frac{3}{4}$ 1.

(ii) *Unguentum Plumbi Carbonatis.* { Carbonate of lead, gr. 62.
 { Simple ointment, $\frac{3}{4}$ 1.

(iii) *Unguentum Plumbi Iodidi.* { Iodide of lead, gr. 62.
 { Simple ointment, $\frac{3}{4}$ 1.

(iv) *Unguentum Plumbi Subacetatis Compositum.*

Melt on a water-bath { White wax, $\frac{3}{4}$ 8 }
 { Almond oil, $\frac{3}{4}$ 16 }.

Remove the vessel, and when the mixture begins to thicken, gradually add solution of subacetate of lead, $\frac{3}{4}$ 6, and stir constantly until it cools.

Add { Camphor, gr. 60 } dissolve, and mix
 { Almond oil, $\frac{3}{4}$ 4 } thoroughly.

2. *Incompatibles.*—Those requiring notice are:—

a. Acetate.—Sulphuric and tannic acids, and their salts.

b. Liquor Plumbi Subacetatis.—Alkalies; lime-water; hard water; mineral acids and salts; vegetable acids; iodide of potassium; astringents; opium-preparations; albuminous liquids.

ACTION.—This is easily summed up as follows:—

1. Many preparations of lead are external astringents and sedatives. The *iodide* is a local stimulant. The *plaster* is non-irritating, and is useful as a support.

2 The *acetate* is a powerful internal astringent and vascular sedative. It is the only preparation used internally. *Dose*—gr. 1 to 4; of *pill*, gr. 4 to 6.

ZINCUM—ZINC.

GENERAL SUMMARY.—The B. P. recognizes the following:—

1. **Zincum** and **Zincum Granulatum**—Metallic Zinc.

2. **Zinci Oxidum**—Oxide of Zinc= ZnO .

3. **Salts.** {

- a. *Zinci Acetas*—Acetate of Zinc = $\text{Zn}(\text{C}_2\text{H}_3\text{O}_2)_2, 2\text{H}_2\text{O}$.
- b. *Zinci Carbonas*—Carbonate of Zinc = $\text{ZnCO}_3, (\text{ZnO})_2, 3\text{H}_2\text{O}$.
- c. *Zinci Chloridum*—Chloride of Zinc = ZnCl_2 .
- d. *Zinci Sulphas*—Sulphate of Zinc = $\text{ZnSO}_4, 7\text{H}_2\text{O}$.
- e. *Zinci Valerianas*—Valerianate of Zinc = $\text{Zn}(\text{C}_5\text{H}_4\text{O}_2)_2$.

4. **Official Preparations.** {

- a. *Unguentum Zinci*.
- b. *Liquor Zinci Chloridi*. Burnett's disinfecting fluid.

SOURCES AND PREPARATION.

A. **Zinc** and **Granulated Zinc**.

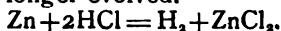
Zinc occurs native as a sulphide or carbonate; and is separated from impurities by sublimation.

Granulated Zinc.—Melt zinc in an earthen crucible, and pour it in a very thin stream into a bucket of cold water; afterwards dry the zinc.

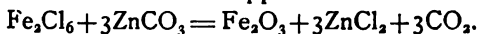
B. From **Granulated Zinc** and **Carbonate**.1. *Chloride*.

a. Add gradually { **Hydrochloric acid**, 22 } to
{ **Water**, 10 }

Granulated zinc, 8, in a porcelain basin, and gently warm in a sand-bath until gas is no longer evolved.



- b. Boil for half an hour, adding water for loss; and allow to stand for 24 hours, stirring frequently.
- c. Filter; pour in **solution of chlorine** by degrees, with frequent agitation, until there is a permanent odour of chlorine. This is for the purpose of removing iron, ferrous chloride being converted into ferric chloride.— $2\text{FeCl}_2 + \text{Cl}_2 = \text{Fe}_2\text{Cl}_6$.
- d. Add **carbonate of zinc**, $\frac{1}{2}$, in small quantities at a time, and agitating, until a brown sediment appears.



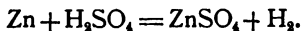
- e. Filter; evaporate until the liquid on a glass rod, cooled, forms an opaque white solid; pour into moulds; and before it has cooled, put into closely-stoppered bottles.

2. *Liquor Zinci Chloridi*.—Prepared as the chloride, except that in the final part of the process, the filtered liquid is evaporated down to the bulk of 20.

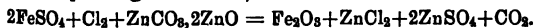
3. *Sulphate*.

- a. Add { **Sulphuric acid**, $\frac{3}{12}$ } to **Granulated**
 { **Water**, 0.4 } **zinc**, $\frac{3}{16}$.

When effervescence has nearly ceased, aid the action by gentle heat.



- b. Filter immediately; and add **chlorine water** and **carbonate of zinc** (as in preparing chloride).

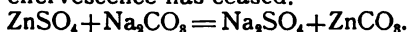


- c. Filter; evaporate; crystallize; and dry the crystals by exposure to the air on filtering paper on porous tiles.

C. From **Sulphate**.1. *Carbonate*.

a. Pour solution of **Sulphate of zinc** upon $\left\{ \begin{array}{l} \text{Carbonate of Soda, } \frac{3}{10} \frac{1}{2} \\ \text{Water, OI.} \end{array} \right.$

b. Stir diligently; and boil for 15 minutes after effervescence has ceased.



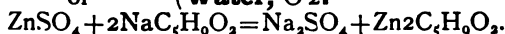
The carbonate of zinc evolves CO_2 as soon as it is precipitated, hence:—



c. Let the precipitate subside; wash it in boiling water from sodic sulphate; and dry by aid of gentle heat.

2. *Valerianate*.—By double decomposition.

a. Mix nearly-boiling solutions of $\left\{ \begin{array}{l} \text{Sulphate of Zinc, } \frac{3}{5} \frac{1}{2} \\ \text{Water, O 2.} \\ \text{Valerianate of Soda, } \frac{3}{5} \\ \text{Water, O 2.} \end{array} \right.$



b. Cool; and skim off the crystals formed.

c. Evaporate the mother liquor under 200° to $\frac{3}{4}$; cool; and remove more crystals.

d. Drain the crystals; wash with water from sulphate of soda; drain again; and dry on filtering paper at the ordinary temperature.

D. From **Carbonate**.

1. *Oxide*.—Expose **carbonate of zinc** to dull red heat in a loosely-covered crucible, until a portion taken from the centre, cooled, does not effervesce with dilute sulphuric acid.

2. *Acetate*.

a. Add **Carbonate of zinc**, $\frac{3}{2}$, to $\left\{ \begin{array}{l} \text{Acetic acid, } \frac{3}{3} \\ \text{Water, } \frac{3}{6} \end{array} \right.$ flask.

b. Heat gently; and add by degrees more acetic acid until the carbonate is all dissolved.

- c. Boil for a few minutes; filter while hot; crystallize; decant, evaporate, and crystallize further; drain and dry the crystals by exposure to air.

CHARACTERS AND PROPERTIES.—These may be readily summed up thus:—

A. **White Powders** { 1. *Oxide*.
2. *Carbonate*.

- a. Odourless and tasteless.
b. Insoluble in water.
c. Soluble in diluted nitric acid, the *carbonate* with effervescence.

B. **Crystals.**

1. *Acetate*.

- a. Thin, crystalline plates.
b. Translucent and colourless, with pearly lustre.
c. Soluble in water (10 in 25).
d. Sharp, unpleasant taste.

2. *Sulphate*.

- a. Minute prisms, like sulphate of magnesia.
b. Colourless and transparent.
c. Soluble in water (10 in 7).
d. Strong, metallic, styptic taste.
e. Efflorescent.

3. *Valerianate*.

- a. In tabular crystals.
b. White; brilliant; and pearly.
c. Feeble odour of valerianic acid; metallic taste.
d. Soluble in water (1 in 120); more in hot water; rectified spirit (1 in 60); ether (1 in 500).
e. When heated with diluted sulphuric acid, valerianic acid is distilled, which, when mixed with solution of acetate of copper, forms after a time oily drops, which gradually pass into a bluish-white crystalline deposit=valerianate of copper.

C. Special.**1. Chloride.**

- a.* In rods or tablets.
- b.* White and opaque.
- c.* Very deliquescent and caustic.
- d.* Soluble in water (10 in 4); also freely in rectified spirit and ether.

2. *Liquor Zinci Chloridi.*

- a.* A colourless liquid.

IMPURITIES.—The following need to be noticed:—

- 1. *Oxide and Carbonate.*—Sulphates and chlorides.
- 2. *Acetate.*—Sulphates, chlorides, and lead.
- 3. *Chloride.*—Sulphate, lime, and iron.
- 4. *Sulphate.*—Iron, lead, and copper.
- 5. *Valerianate.*—Sulphate; butyric acid.

PHARMACY.—1. *Officinal Preparation.*

Unguentum Zinci.

Add { Finely-powdered oxide of } and stir
 { zinc, gr. 80 } till cool.
 { Melted benzoated lard, $\frac{3}{4}$ i }

2. *Incompatibles.*—Alkalies and their carbonates; lime-water; acetate of lead; nitrate of silver; astringent vegetable infusions or decoctions; and milk.

ACTION.—The action of the preparations of zinc may be thus arranged:—

1. *Solution of chloride* is a valuable deodorant and disinfectant; also used as antiseptic.

2. Externally, *chloride* is a powerful escharotic. Several preparations are local astringents.

3. Internally, *oxide*, *acetate*, and *carbonate* are astringent. *Oxide* is much used as anti-diaphoretic. Most of the compounds are nerve tonics. *Sulphate* and *acetate* are non-depressing emetics.

Doses—Of *Oxide* or *Carbonate*, gr. 2 to 10.

Acetate, gr. 1 to 2; as emetic, gr. 10 to 20.

Chloride, gr. $\frac{1}{2}$ to 2; seldom given.

Sulphate, gr. 1 to 2; as emetic, gr. 10 to 30.

Valerianate, gr. 1 to 6 or more.

METALS AND SOLUTIONS IN APPENDIX.

In addition to those already mentioned, the following are in the *Appendix* of the B.P. for testing purposes.

1. *Platinum foil.*
2. *Platinum Black*, in a state of minute division.
3. *Granulated Zinc.*
4. *Solution of Chloride of Barium*, $\frac{3}{1}$ in $\frac{3}{10}$.
5. *Solution of Chloride of Gold.*
6. *Solution of Chloride of Zinc.*
7. *Solution of Perchloride of Platinum.*

ORGANIC CHEMICAL PRODUCTS.

I. ACIDUM HYDROCYANICUM DILUTUM—
DILUTE HYDROCYANIC ACID.

A Solution of 2 per cent. of HCN gas in water.

SOURCE AND PREPARATION.—From ferrocyanide of potassium, by the following process:—

- a. Mix in { **Sulphuric acid**, $\frac{3}{4}$ 1.
a retort { **Water**, $\frac{3}{4}$ 4.
- b. When { **Ferrocyanide of potassium**, $\frac{3}{4}$ 2½.
cool, add { **Water**, O $\frac{1}{2}$.

c. Distil gently into a cool receiver containing water, $\frac{3}{4}$ 8, until the whole measures $\frac{3}{4}$ 17; and add water to the required strength.



CHARACTERS AND PROPERTIES.

- a. A colourless liquid.
- b. Powerful and peculiar odour.
- c. Taste at first cooling; then irritating.
- d. Slight and transient acid reaction.
- e. Sp. gr. 0.997.
- f. Volatile, and entirely volatilized by heat.
- g. Liable to be decomposed on exposure to light; and hence is kept in dark-blue bottles.

IMPURITIES.—Sulphuric and hydrochloric acids. The presence of a trace of mineral acid is said to prevent decomposition.

QUANTITATIVE TEST.

270 grains rendered alkaline by solution of soda,	} require {	1000 grain-measures of Vol. solution of Nitrate of Silver, before a permanent precipitate forms.

PHARMACY.—I. *Officinal Preparation.*

a. *Vapor Acidi Hydrocyanici* { Dilute Hydrocyanic acid,
m 10 to 15.
Cold water, m 60.

2. *Incompatibles.*—Sulphurets; salts of silver, copper, and iron; red oxide of mercury.

ACTION.—External sedative. Internal sedative—gastric, vascular, and pulmonary. Antispasmodic.

II. ALCOHOL GROUP.

GENERAL SUMMARY.—The forms in which ethylic alcohol is recognized in the B.P., may be thus arranged:—

1. **Absolute or Anhydrous Alcohol**, free from water, in the *Appendix* for testing.

2. **Spiritus Rectificatus—Rectified spirit—Spirits of wine.**—Alcohol with 16 per cent. by weight, 11 per cent. by volume, of water.

3. **Spiritus Tenuior—Proof spirit.**—Diluted rectified spirit, containing 49 per cent. by weight, 58 per cent. by volume, of alcohol.

4. **Spiritus Vini Gallici—Spirit of French wine—Brandy.**—Contains about 55 per cent. of alcohol by measure, with volatile oil and œnanthic ether.

a. *Mistura Spiritus Vini Gallici.*

5. **Vinum Xericum—Sherry Wine.**—Contains 17 to 18 per cent. of alcohol, œnanthic ether, cream of tartar, malates, sugar, etc.

6. **Vinum Aurantii—Orange Wine.**—Contains about 12 per cent. of alcohol.

SOURCE AND PREPARATION.—This part of the subject may be very briefly discussed.

1. *Absolute alcohol.*—Made by acting upon **rectified spirit**, first by **carbonate of potash** and

then by freshly-burnt **quicklime**, which absorbs the water; and distilling the product, rejecting the first portion.

2. *Rectified spirit*.—Obtained by distillation of fermented saccharine fluids (wines, malt liquors, etc.) in which the *Torula cerevisiæ* is present, at a temperature between 60° and 80°. The sugar is decomposed into alcohol and carbonic acid.



The product is rectified, until it is of the proper density.

3. *Proof spirit*. Mix { **Rectified spirit**, 5.
 Water, 3.

4. *Brandy*.—Spirit distilled from French wine.

5. *Sherry Wine*.—A specially prepared Spanish wine.

6. *Orange-wine*.—Wine made in Britain by the fermentation of a saccharine solution, to which the fresh peel of bitter orange has been added.

CHARACTERS AND PROPERTIES.—It is only necessary to allude here to the purely alcoholic group, (excluding brandy and wines), and their characters and properties may be readily summed up thus:—

1. They are colourless liquids.
2. Peculiar alcoholic odour and taste.
3. Tend to evaporate; are volatilized with heat; and inflammable, burning with a blue flame without smoke.

4. Sp. gr. { *a.* Alcohol, 0·795
 b. Rectified spirit, 0·838.
 c. Proof spirit, 0·920.

5. Remain clear when diluted with water.
6. Rectified spirit mixes in all proportions with water, ether, acetic ether, and amyl nitrite.
7. Rectified spirit dissolves ammonia, potash (not the carbonate), soda, and lithia; iodine, and bromine; sulphur; phosphorus; many alkaline

and metallic salts, especially those that are deliquescent; castor oil, camphor and volatile oils, balsams; tannic and gallic acids; sugar and mannite; vegetable alkaloids; and colouring matters.

TESTS.—In the B.P., special tests are applied to alcohol and rectified spirit.

a. Alcohol does not cause anhydrous sulphate of copper to assume a blue colour when left in contact with it=absence of water.

b. Rectified spirit.— $\frac{3}{4}$ with 30 grain-measures of *Vol. solution of nitrate of silver*, exposed for 24 hours to bright light, and then decanted from the black powder which has formed, undergoes no further change when again exposed to light with more of the test. This indicates that amylic alcohol or fusel oil and aldehyde are not present in excess.

PHARMACY.—I. *Officinal Preparation.*—The only named one is:—

<i>Mistura Spiritus</i>	} Mix	{ French brandy, $\frac{3}{4}$.
<i>Vini Gallici.</i>		{ Sugar, $\frac{3}{4}$.
		{ The yolk of two eggs.
		{ Cinnamon water, $\frac{3}{4}$.

2. The members of this group are pharmaceutically employed in making other important preparations in the B.P., as follows:—

a. Rectified spirit is used in preparing, or is a constituent of:—

(i) Several Tinctures.

(ii) Almost all the officinal Spirits and the Essences.

(iii) Aconitia, atropia, sulphate of beberia, strychnia, veratria, digitaline, and santonine.

b. Proof spirit is used in preparing:—

(i) Most Tinctures.

(ii) Spiritus Armoraciæ Compositus.

c. Sherry wine is the basis of all the official Wines, except:—

d. Orange-wine, { Vinum Ferri Citratis.
contained in { Vinum Quiniæ.

ACTION.—Alcohol in various forms is antiseptic; external refrigerant, if evaporation is allowed; stimulant, or rubefacient, if evaporation is prevented. Internally, alcohol may act as gastric stimulant; diffusible stimulant, especially upon nerve-centres and heart; depressant and narcotic in full doses; diaphoretic; diuretic; or antipyretic.

ALCOHOL AMYLICUM—**AMYLIC ALCOHOL**—**FUSEL OIL**
= $C_5H_{12}O$.

It will be sufficient to mention this liquid, which is one of the products of the fermentation of saccharine solutions, and accumulates in the last portions of crude spirit submitted to distillation. It is introduced into the B.P., for the purpose of making Amyl Nitrite and Valerianate of Soda.

III. ÆTHER GROUP.

GENERAL SUMMARY.—The different forms of ether recognised in the B. P., include:—

1. **Æther—Sulphuric Ether.**—A mixture of 92 per cent. by volume of pure ether or oxide of ethyl ($C_4H_{10}O$), with about 8 per cent. of rectified spirit.

2. **Æther Purus—Pure Ether.**—Ether free from alcohol and water.

3. **Spiritus Ætheris—Spirit of Ether.**—A mixture of ether and rectified spirit (1 to 2).

4. **Spiritus Ætheris Nitrosi—Spirit of Nitrous Ether—Sweet Spirit of Nitre.**—A solution in rectified spirit of nitrous ether ($C_2H_5NO_2$) = 10 per cent. by volume.

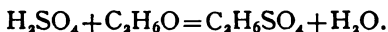
5. **Æther Aceticus—Acetic Ether—Acetate Ethyl** = $C_2H_5C_2H_3O_2$.

SOURCES AND PREPARATION.

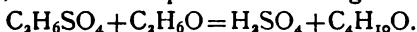
1. *Æther*.—Obtained from rectified spirit, by a complicated process, of which the following are the essential parts:—

- a. Add in successive { **Sulphuric acid**, $\frac{3}{4}$ 10
portions, and distil { **Rectified spirit**, $\frac{3}{4}$ 50.
- b. Allow the distillate to stand on **chloride of calcium** and **slaked lime**, in order to purify it from water, sulphurous acid, and sulphuric acid.
- c. Re-distil until it becomes of sp. gr. 0.735.

In this process *sulphovinic acid* is first formed, thus:—



The sulphovinic acid is again decomposed by the alcohol, ether and sulphuric acid being formed:—



This process may be continued indefinitely by adding more alcohol.

2. *Æther Purus*.—Prepared from ether, thus:—

- a. Wash ether well with water, to remove the rectified spirit.
- b. When the liquids separate, decant the supernatant ether.
- c. Digest the ether for 24 hours with recently burnt **lime** and **chloride of calcium**, to remove the water.
- d. Distil with a gentle heat.

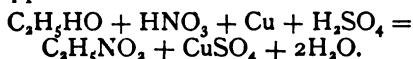
3. *Spiritus Ætheris*.—Mix { **Æther**, 1
 { **Rectified spirit**, 2.

4. *Spiritus Ætheris Nitrosi*.—Made from rectified spirit, by the following method:—

- a. Add gradually { **Rectified spirit**, 0.1 to };
 { **Sulphuric acid**, $\frac{3}{4}$ 2 };
and then add gradually **nitric acid**, $\frac{3}{4}$ 2½.

- b.* Distil in a retort with fine **copper-wire**, $\frac{3}{4}$ 2, between 170° and 180° , until $\frac{3}{4}$ 12 have passed over.
- c.* Allow the contents of the retort to cool; again add **nitric acid**, $\frac{3}{4}$ $2\frac{1}{2}$; and distil until the distillate has increased to $\frac{3}{4}$ 15.
- d.* Mix with **rectified spirit**, O 2, or as much as will make it of sp. gr. = 0.845, and of the proper strength.

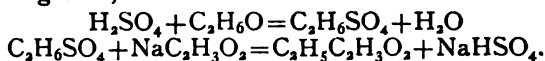
In this process *ether* is first formed, which combines with the *nitrous acid* produced by the action of the copper on nitric acid.



5. *Æther Aceticus*.—Made in the following way:—

- a.* Distil $\left\{ \begin{array}{l} \text{Rectified spirit, 5} \\ \text{Sulphuric acid, 10} \\ \text{Dry acetate of soda, 8.} \end{array} \right.$

Ether is formed; *acetic acid* is liberated from the acetate of soda; they combine, acetic ether distilling over, with some water.



- b.* Add the product to half its weight of **chloride of calcium**, in a stoppered bottle; and allow it to remain for $2\frac{1}{4}$ hours. The water is thus removed.
- c.* Decant; and rectify the ethereal liquid.

CHARACTERS AND PROPERTIES.—The characters and properties of the several ethers may be readily grouped in the following way:—

1. They are colourless, mobile liquids; Spirit of Nitrous Ether may have a faint yellow tinge.
2. Volatile, especially ether and pure ether, with the production of considerable cold; they leave no residue on evaporation; and are inflammable.

3. They have each a peculiar odour and taste :—

	ODOUR.	TASTE.
<i>Ether</i>	Strong and sweet ; fragrant.	Hot and pungent.
<i>Nitrous Ether</i>	Agreeable and pene- trating; apple-like.	Cooling ; sweetish and sharp.
<i>Acetic Ether</i>	Agreeable ; ethereal ; faintly like apples.	Burning.

4. The Sp. gr. are as follows :—

Æther	= 0·735
Æther Purus	= 0·720
Spiritus Ætheris	= 0·809
Spiritus Ætheris Nitrosi	= 0·845
Æther Aceticus	= 0·910

5. Nitrous ether has a slight acid reaction usually. Acetic ether should not have this reaction. Ether scarcely reddens litmus.

6. Water dissolves ether (1 in 10); acetic ether (about 1 in 12). Spirit of ether readily mixes with water. Ether is soluble in all proportions in rectified spirit; and acetic ether in both rectified spirit and ether.

7. Ether dissolves iodine, bromine, and corrosive sublimate freely; sulphur and phosphorus sparingly; volatile and fixed oils; many resins and balsams; caoutchouc; and most of the vegetable alkaloids. It does not dissolve the caustic alkalies.

IMPURITIES AND TESTS.

1. *Ether.*

a. 50 measures agitated with an equal volume of water are reduced to 45, by an absorption of 10 per cent.

b. Agitated with half its volume of a saturated solution of chloride of calcium, ether is not lessened in bulk—indicating absence of acid and water.

2. *Spirit of Nitrous Ether.*

- a. Effervesces feebly or not at all, when shaken with a little bicarbonate of soda = acid.
- b. Agitated with solution of sulphate of iron, and a few drops of sulphuric acid, it becomes deep olive-brown or black.
- c. Agitated with twice its volume of saturated solution of chloride of calcium, in a closed tube, 2 per cent. of its original volume will rise to the surface as an ethereal liquid.

PHARMACY.—1. *Ether* is contained in Collodion; Collodion Flexile; and Liquor Epispasticus. It is used in preparing Extractum Filicis Maris. *Washed Ether* is employed in making Extractum Ergotæ Liquidum, to remove the oil from the ergot, previous to making the extract.

2. *Spirit of Ether* is contained in Tinctura Lobeliæ Ætherea.

3. *Incompatibles.*—Spirit of Nitrous Ether is incompatible with iodide of potassium; sulphate of iron; tincture of guaiacum; gallic and tannic acids; and emulsions.

ACTION.—Ether, by inhalation, is a general anæsthetic, pure ether being much employed during operations for this purpose. Externally, it may be refrigerant, local anæsthetic, stimulant, or rubefacient. Internally, spirit of ether is usually given, being a powerful diffusible stimulant, antispasmodic, narcotic, and expectorant. Acetic ether has similar actions, but is less powerful. Spirit of nitrous ether is a stimulant, diaphoretic, and diuretic.

IV. CHLOROFORMUM — CHLOROFORM — TERCHLORIDE OF FORMYL = CHCl_3 .

SOURCE AND PREPARATION.—Prepared from chlorinated lime and rectified spirit, as follows:—

1. Distil { **Chlorinated lime**, lb 10.
 Slaked lime, lb 5.
 Rectified spirit, $\frac{3}{4}$ 30.
 Water, C 3.

2. Wash $\frac{3}{4}$ 50 of the distillate with water; allow the mixture to separate into two strata; remove the lower stratum = crude chloroform; wash repeatedly; and shake with its own volume of **sulphuric acid**.

3. Separate the chloroform;
mix with { **Chloride of calcium**, $\frac{3}{4}$ 2 } and
 { **Slaked lime**, $\frac{3}{4}$ 1 } re-distil.

The changes which take place are doubtful, but it is supposed that (1) alcohol is oxidized to form aldehyde and water; (2) aldehyde and chlorine produce chloral and hydrochloric acid; (3) chloral and hydrate of calcium are decomposed to form chloroform and formiate of calcium.

CHARACTERS AND PROPERTIES.

1. A colourless, limpid liquid.
2. Peculiar ethereal odour; and sweet taste.
3. Neutral in reaction.
4. Heavy; sp. gr. 1.49.
5. Volatile; evaporates speedily, and leaves no residue or odour.
6. Burns, though not readily, with a green smoky flame.
7. Dropped into water it suddenly sinks, and remains without opacity. Soluble in water (1 in 200); rectified spirit (10 in 7); ether (1 in $1\frac{1}{2}$); freely in olive oil and oil of turpentine. Insoluble in glycerine.

8. Dissolves most resins and fats; fixed and volatile oils; most organic alkaloids; iodine and bromine; caoutchouc and gutta percha; benzoin; wax partially; sulphur and phosphorus sparingly.

9. Liable to decompose on exposure to air and light, HCl and Cl being formed; also decomposed by fixed alkalis.

10. Is not coloured when shaken with sulphuric acid; and does not evolve gas when potassium is dropped into it.

PHARMACY.—I. *Officinal Preparations*:—

a. *Aqua Chloroformi*. { Chloroform, 3 i } Dissolve
 { Water, 3 25 } by shaking.

Dose— $\frac{3}{4}$ to 2.

b. *Linimentum Chloroformi.* { Chloroform, 1
Liniment of camphor, 1 } Mix.

c. *Spiritus Chloroformi* { Chloroform, 1
Sp. gr. 0.871. { Rectified spirit, 19 } Mix.

Dose—m. 10 to 60.

d. Tinctura Chloroformi { Chloroform, 2.
Composita. — Deep lake { Rectified spirit, 8.
colour. { Compound tincture of
Dose—m 20 to 60. { cardamoms, 10.

Dose—m 20 to 60.

ACTION.—External stimulant, and aids the effects of certain drugs. Internally, sedative, antispasmodic, and narcotic. Chiefly used as a general anæsthetic, by inhalation.

V. CHLORAL HYDRAS — HYDRATE OF
CHLORAL = C_2HCl_3O, H_2O .

SOURCE AND PREPARATION.—Prepared by the action of chlorine gas upon alcohol, thus:—

1. Pass dry **chlorine** through **anhydrous alcohol** for several days, so long as it is absorbed.

2. Purify the liquid thus produced, by treating it (a.) with **sulphuric acid**, to remove water and

alcohol; (b.) with a small quantity of **lime**, to take up HCl that is formed.

3. Add **water**, by which the chloral is converted into the hydrate.

The reactions by which chloral is produced are complicated, aldehyde and hydrochloric acid being first formed; and ultimately chloral.

CHARACTERS AND PROPERTIES.

1. In small colourless crystals.
2. Not deliquescent on exposure to air.
3. Peculiar, pungent, but not acrid odour.
4. Pungent and rather bitter taste.
5. Soluble in less than its own weight of water, rectified spirit, and ether; in four times its weight of chloroform.

6. The aqueous solution is neutral or but slightly acid=absence of HCl.

7. Melts with gentle heat to a colourless transparent liquid, which solidifies at about 120° ; boils about 205° in a test-tube with pieces of broken glass; volatilizes at a slightly higher temperature on platinum foil, without residue.

8. Decomposed by alkalies into chloroform and an alkaline formiate.

9. A solution in chloroform, agitated with sulphuric acid, does not colour it=absence of oily impurities.

QUANTITATIVE TEST.—100 grains dissolved in $\frac{3}{4}$ 1 of water, and mixed with 30 grains of slaked lime, yield not less than 70 grains of chloroform on careful distillation.

PHARMACY.—*Official preparation* :—

<i>Syrupus Chloral</i> ,	{	Hydrate of chloral, gr. 80.
= gr. 10 in 3 1		Water, $\frac{3}{4}$ 1.
		Syrup, to make up $\frac{3}{4}$ 1.

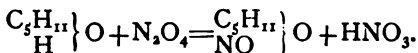
ACTION.—Hypnotic. Sedative. Antispasmodic. Antiseptic.

Dose—gr. 5 to 30.

VI. AMYL NITRIS—NITRITE OF AMYL = $C_5H_{11}NO_2$.

SOURCE AND PREPARATION.—From amylic alcohol.

1. Add **Sulphuric acid** $\left\{ \begin{array}{l} \text{Purified amylic alcohol} \\ \text{Copper foil} \end{array} \right\}$ in a $\left(\frac{1}{10} \right)$ th its volume) to $\left. \begin{array}{l} \text{Purified amylic alcohol} \\ \text{Copper foil} \end{array} \right\}$ glass retort.
2. Add the same quantity of **nitric acid**, diluted with an equal volume of water.
3. Distil with gentle heat, adding more nitric acid until almost all the amylic alcohol is exhausted.
4. Wash the distillate with **solution of soda**, to remove hydrocyanic and other free acids.
5. Rectify over fused **carbonate of potash**, to get rid of the water, reserving the portion which distils over between 205° and 212° .



CHARACTERS AND PROPERTIES.

1. An ethereal liquid, of yellowish-colour.
2. Very volatile; boils at 205° .
3. Peculiar, and not disagreeable odour.
4. Sp. gr. 0.877.
5. Almost insoluble in water; freely soluble in alcohol, ether, and chloroform.
6. If added drop by drop to fused caustic potash, valerianate of potash is formed.

ACTION. — Anodyne. Sedative. Vaso-dilator. Used internally, and by inhalation.

Dose— $m\frac{1}{2}$ to 5 internally; m 2 to 5 by inhalation.

VIII. CREASOTUM—CREASOTE.

SOURCE AND PREPARATION.—One of the products of the destructive distillation of wood; and also obtained from oil of tar.

CHARACTERS AND PROPERTIES.

1. An oily liquid, colourless or yellowish, and strongly refracting.

2. Peculiar powerful odour; and burning taste.

3. Sp. gr. = 1.071. Boiling point, about 400°.

4. Sparingly soluble in water (1 in 80); freely in alcohol and ether; in glacial acetic acid (1 in 1), but separates on the addition of water. Insoluble in glycerine.

5. Coagulates albumen, but not collodion.

6. A slip of deal dipped into creasote, and afterwards into HCl, and allowed to dry in the air, acquires a greenish-blue colour.

7. Dropped on white filtering paper and heated to 212°, it leaves no translucent stain.

PHARMACY.—1. *Officinal Preparations.*

a. *Mistura Creasoti.* Mix { Creasote, ℥ 16
Glacial acetic acid, ℥ 16 } ; gradually add water, ℥ 15; and then { Syrup, ℥ 1.
Spirit of Juniper, 3 ½.

Dose—3 ½ to 1 ½.

b. *Unguentum Creasoti* { Creasote, 1
Simple ointment, 8 } Mix.

c. *Vapor Creasoti* { Creasote, ℥ 12.
Boiling water, 3 8.

2. *Incompatible.*—Oxide of Silver.

ACTION.—External, escharotic; styptic; antiseptic; stimulant. Internally, gastric sedative; astringent; antiseptic; expectorant. By inhalation, antiseptic; and expectorant.

Dose—Of Creasote, ℥ 1 to 3.

SECTION III.

THE ORGANIC KINGDOM.

This kingdom includes the two divisions of:—
1. **Vegetable** or **Botanical**. 2. **Animal**. I propose to treat of these divisions according to the following plan:—

1. To arrange, in the form of a TABLE, the drugs immediately derived from the vegetable kingdom under their several *Natural Orders*, with the view of simply making the student acquainted at the outset with their (a) *names*; (b) *botanical* and *geographical sources*; (c) *nature*, as to the part or parts of the plant used, or any special product obtained from it; (d) *chief constituents*, especially their *active principles*. He should make himself tolerably familiar with this outline of the subject, before proceeding further.

2. To discuss the vegetable drugs under GROUPS, as parts of plants (roots, leaves, flowers, &c.), or particular products (gums, resins, oils, &c.), indicating:—a. Their *official source, natural order, and nature*; b. Their *chief characters and properties*; c. Their *pharmacy and action*. In most cases it will be convenient to arrange this part of the subject in a tabular form, but not in all.

3. To give a brief account of the drugs derived from the ANIMAL KINGDOM.

TABLE OF NATURAL ORDERS.

I. EXOGENÆ.

A. THALAMIFLORÆ.

Nat. Ord. **RANUNCULACEÆ.**

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Aconitum Napellus. <hr/> Monkshood. <hr/> <i>Indigenous.</i> <hr/> Cultivated in Britain. Root also imported from Germany.	1. <i>Aconiti Folia.</i> The fresh leaves and flower- ing tops, gathered in July, when about one- third of the flowers are expanded. 2. <i>Aconiti Radix.</i> The dried root, col- lected in winter and early spring. 3. <i>Aconitia.</i> The alkaloid derived from the official parts of the plant.	All the recognized parts of the plant con- tain:— 1. <i>Aconitia</i> , the of- ficial alkaloid. 2. <i>Aconella</i> , an alka- loid. 3. <i>Aconitic acid.</i>
Podophyllum Peltatum. <hr/> American May Apple. <hr/> <i>United States.</i> Imported from North America.	1. <i>Podophylli Radix.</i> The dried rhizome. 2. <i>Podophylli Resina</i> — <i>Podophyllin.</i> The resin obtained from the rhizome.	1. <i>Podophyllin</i> , or the official resin. 2. <i>Berberine</i> , an al- kaloid. 3. <i>Saponin</i> , a gluco- side.

Nat. Ord. MAGNOLIACEÆ.

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
<i>Illicium</i> <i>Anisatum</i>. — Star Anise. — <i>China</i> .	<i>Oleum Anisi</i> . Volatile oil distilled from the fruit. This is one of the two sources of <i>Oleum Anisi</i> .	

Nat. Ord. MENISPERMACEÆ.

<i>Jateorrhiza</i> <i>Calumba</i>. — <i>Calumba</i> or <i>Columbo</i>. — Forests of East- ern Africa, be- tween Ibo and the Zambesi.	<i>Calumbæ Radix</i> . The root sliced trans- versely, and dried.	1. <i>Calumbine</i> , a neu- tral principle, 2. <i>Calumbic</i> <i>acid</i> . 3. <i>Berberine</i> , an alkaloid. 4. Starch. (Does not contain tannic or gallic acid).
<i>Cissampelos</i> <i>Paireira</i>. — Velvet Leaf. — Also <i>Chondodendron</i> <i>Tomentosum</i>. (Hanbury). — <i>Brazil</i> .	<i>Paireiræ Radix</i> . Dried root.	1. <i>Pelosine</i> or <i>Ciss- ampeline</i> —a base, sup- posed to be identical with <i>Beberia</i> . 2. Resin; bitter yel- low matter; starch.

Nat. Ord. PAPAVERACEÆ.

<i>Papaver</i> <i>Somniferum</i>. — Garden Poppy. — Grown in Asia Minor. Cultivated in Britain.	1. <i>Papaveris Cap- sulæ</i> . Nearly ripe dried capsules. 2. <i>Opium</i> . The juice obtained from inci- sions made in the un- ripe capsule, inspiss- ated by spontaneous evaporation.	The principles con- tained in opium are very numerous, and only the most import- ant need be mentioned here. 1. <i>Alkaloids</i> . a. <i>Morphia</i> = at least 6 to 8, or 9 to 12 per cent. in good opium.
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Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
	<p>3. <i>Morphiæ Acetas</i>. Acetate of morphia. Prepared from :—</p> <p>4. <i>Morphiæ Hydrochloras</i>. Hydrochlorate of morphia. Prepared from opium.</p>	<p>b. Codeia. c. Papaverine. d. Cryptopia. e. Thebaia. f. Paramorphia. g. Narcotine. = 6 to 8 per cent.</p> <p>2. <i>Neutral crystalline bodies</i>. a. Meconin. b. Narcein.</p> <p>3. <i>Acids</i>. a. Meconic = 8 per cent. b. Thebolactic.</p> <p>4. <i>Other Ingredients</i>. a. Extractive matters. b. Resin, gum, volatile oil. c. Salts.</p>
<p>Papaver Rhœas. — Red Poppy. — <i>Indigenous.</i></p>	<p><i>Rhœados Petala.</i> The fresh petals, collected immediately after the expansion of the flower.</p>	<p>1. <i>Morphia</i>. (Attfield says there is none.) 2. <i>Rhœadin</i>, crystallizable non-poisonous alkaloid. 3. <i>Acids</i>; colouring matter.</p>

Nat. Ord. CRUCIFERÆ.

<p>Cochlearia Armoracia. — Horse-Radish. — <i>Indigenous.</i> Cultivated in Britain.</p>	<p><i>Armoracia Radix.</i> The fresh root. It may be kept fresh by burying it in sand, in a cool place.</p>	<p>Volatile oil is obtained when horse-radish is moistened with water = Sulphocyanide of Butyl, formed by a decomposition. (See VOLATILE OILS).</p>
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Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Sinapis Nigra et Alba. — Black and White Mustard. — <i>Indigenous.</i>	1. <i>Sinapis.</i> The seeds of black and white mustard, reduced to powder, mixed. 2. <i>Oleum Sinapis.</i> Volatile oil distilled from the seeds of black mustard, after the expression of the fixed oil. Produced by decomposition. (See VOLATILE OILS).	1. <i>Fixed oil</i> in both = 25 to 35 per cent. 2. <i>Myrosine</i> in both = an albuminous ferment. 3. <i>Myronate of potash</i> in black mustard. 4. <i>Sinabin</i> , a glucoside in white mustard. 5. <i>Sinapin</i> , an alkaloid in both, as a sulphocyanide = sulpho-sinapisin.

Nat. Ord. **POLYGALACEÆ.**

Krameria Triandra. — <i>Peru and Chili.</i>	<i>Krameria Radix.</i> The dried root.	1. <i>Krameric Acid.</i> 2. <i>Rhatanin.</i> 3. <i>Tannic Acid</i> = about 40 per cent.
Polygala Senega. — Senega. — <i>North America.</i>	<i>Senega Radix.</i> The dried root stock, with branched tap-root.	1. <i>Senegin</i> or <i>Polygalic Acid.</i> 2. <i>Tannin.</i> 3. <i>Resin.</i> 4. <i>Sugar, &c.</i>

Nat. Ord. **LINACEÆ.**

Linum Usitatissimum. — Flax. — <i>Indigenous.</i>	1. <i>Lini Semina—Linseed.</i> The seeds. 2. <i>Lini Farina—Linseed-meal.</i> The seeds, ground and deprived of the oil by expression, and the cakes reduced to powder. 3. <i>Oleum Lini—Linseed oil.</i> The oil expressed from linseed without heat.	1. The <i>fixed oil</i> , which is official = about 20 to 30 per cent. 2. A peculiar <i>gummy matter</i> or <i>mucilage</i> in the envelope or testa of the seeds, which is readily imparted to hot water.
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Nat. Ord. MALVACEÆ.

Botanical Source or Name of Plant. Geographical Source.	Official Nature — Part of Plant or Product.	Active Principles, and Chief Constituents.
Gossypium. Various species. — <i>North America and India.</i>	1. <i>Gossypium</i> — <i>Cotton wool</i> . The hairs of the seeds, carded. 2. <i>Pyroxylin</i> or <i>gun-cotton</i> —made from cotton wool. 3. <i>Collodion</i> —made from pyroxylin. 4. <i>Collodion Flexile</i> —made from collodion.	Cotton is a modification of <i>lignin</i> . The other preparations will be subsequently considered.

Nat. Ord. BYTTNERIACEÆ.

Theobroma Cacao. — <i>West Indies and South America.</i>	<i>Oleum Theobromæ</i> — <i>Cacao butter</i> . A concrete oil, obtained by expression and heat from the ground seeds.	Chiefly <i>stearin</i> , with a little <i>olein</i> .
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Nat. Ord. AURANTIACEÆ.

Citrus Bigaradia. — <i>Seville and Bitter Orange.</i>	1. <i>Aqua Aurantii Floris</i> .—Water distilled from the flowers of the bitter and sweet orange.	A small quantity of peculiar volatile oil—oil of Neroli.
Citrus Aurantium. — Sweet Orange. — <i>South Europe. Spain.</i>	2. <i>Aurantii Cortex</i> — <i>Bitter orange peel</i> . The outer part of the rind of the ripe fruit of <i>Citrus Bigaradia</i> , fresh and dried. The fruit is a <i>hesperidium</i> .	
		1. Volatile oil. 2. Bitter extractive Hesperidin or Aurantitin. 3. A little gallic acid.

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Citrus Limonum. Lemon. The ripe fruit. South Europe. Lemon-oil is chiefly imported from <i>Sicily</i> .	1. <i>Limonis Succus</i> — <i>Lemon-juice</i> . The freshly expressed juice of the ripe fruit. 2. <i>Limonis Cortex</i> — <i>Lemon-peel</i> . The outer part of the rind of the fresh fruit. 3. <i>Oleum Limonis</i> — <i>Oil of Lemon</i> . The oil expressed or distilled from the fresh peel.	1. Citric acid = 32.5 grains in fl. 3i. 2. Malic and phosphoric acids. 3. Mucilage; sugar; salts. 1. Volatile oil. 2. Hesperidin. 3. A little gallic acid.
Egle Marmelos. Bael. Malabar and Coromandel.	<i>Bela Fructus</i> — <i>Bael fruit</i> . The half-ripe fruit, dried.	An astringent principle, allied to tannin.

Nat. Ord. CANNELLACEÆ.

Canella Alba. White Canella. West Indies.	1. <i>Canellæ Albæ Cortex</i> — <i>Canella Bark</i> . The dried bark.	1. Resin. 2. Volatile oil. 3. Bitter extractive. (Does not contain tannic or gallic acid).
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Nat. Ord. GUTTIFERÆ.

Garcinia Morella. Gamboge. Siam.	<i>Cambogia</i> — <i>Gamboge</i> . A gum-resin obtained from the plant.	1. Yellow, acrid resin — <i>Gambogic Acid</i> = 75 to 80 per cent. 2. Soluble gum = from 20 to 25 per cent.
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Nat. Ord. VITACEÆ.

Botanical Source or Name of Plant. Geographical Source	Official Nature — Part of Plant or Product.	Active Principles, and Chief Constituents.
Vitis Vinifera — Grape-Vine. — <i>Spain.</i>	1. <i>Uvæ</i> — Raisins. The ripe fruit, dried in the sun or with artificial heat.	1. Grape-sugar. 2. Acid tartrate of potash. 3. Malic acid. 4. Fixed oil, in seeds. 5. Tannic acid, in seeds and skin.

Nat. Ord. ZYGOPHYLLACEÆ.

Guaiacum Officinale. — <i>St. Domingo and Jamaica.</i>	1. <i>Guaiaci Lignum</i> — <i>Guaiacum</i> Wood — <i>Lignum Vitæ.</i> The wood in logs, small chips, or coarse powder. 2. <i>Guaiaci Resina</i> — <i>Guaiacum</i> Resin. The resin obtained from the stem by natural exudation, incision, or heat.	<i>Resin</i> = 26 per cent. 1. Guaiacic acid. 2. Guaiaretic acid. 3. Guaiaconic acid.
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Nat. Ord. RUTACEÆ.

Barosma Betulina; Barosma Orenulata; Barosma Serratifolia. — Bucco or Buchu. — <i>Cape of Good Hope.</i>	1. <i>Buchu Folia</i> — <i>Buchu Leaves.</i> The dried leaves.	1. Volatile oil = about $1\frac{1}{2}$ per cent. 2. Bitter extractive = <i>Barosmin</i> or <i>Diosmin</i> .
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Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Galipea Cusparia. — Angustura Bark Tree. — <i>Tropical South</i> <i>America.</i>	1. <i>Cuspariæ Cortex</i> — <i>Cusparia</i> or <i>Angus-</i> <i>tura</i> bark. The dried bark.	1. Resin. 2. Neutral bitter principle= <i>Cusparin</i> or <i>Angusturin</i> . 3. Trace of volatile oil.
Ruta Graveolens. — Rue. — <i>South of Europe.</i>	1. <i>Oleum Rutæ</i> — <i>Oil</i> <i>of Rue</i> . The volatile oil distilled with water from the fresh herb.	

Nat. Ord. SIMARUBACEÆ.

Picroena Excelsa. — Quassia. — <i>Jamaica.</i>	<i>Quassia Lignum</i> — <i>Quassia</i> wood. The wood in billets, rasp- ings, or chips.	1. Neutral crystal- lizable bitter principle, = <i>Quassine</i> . 2. Some starch. (Does not contain tannin).
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B. CALICYFLORÆ.**Nat. Ord. RHAMNACEÆ.**

Rhamnus Catharticus. — Buckthorn. — <i>Indigenous.</i>	1. <i>Rhamni Succus</i> — <i>Buckthorn Juice</i> . The recently expressed juice of the ripe berries.	1. Sugar. 2. Mucilage. 3. A purgative prin- ciple. 4. Green colouring matter.
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Nat. Ord. ANACARDIACEÆ.

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Pistacia Lentiscus. — <i>Levant.</i> <i>Island of Scio.</i>	1. <i>Mastiche</i> — <i>Mastic.</i> A resinous exudation obtained by incision from the stem.	1. Masticic acid. 2. Masticin. 3. A little volatile oil.

Nat. Ord. AMYRIDACEÆ.

Canarium Commune. — <i>Manilla.</i>	1. <i>Elemi.</i> A concrete resinous exudation.	1. A crystalline resin, <i>Elemi</i> = 25 per cent. 2. Uncrystallizable resin = 60 per cent. 3. Volatile oil = 10 to 12 per cent. 4. Crystalline, bitter, neutral principle = 1 to 2 per cent.
Balsamodendron Myrrha. — <i>Arabia and Abyssinia.</i>	1. <i>Myrrha</i> — <i>Myrrh.</i> A gum-resinous exudation from the stem.	1. Gum, like arabin. 2. Resin = <i>Myrrhin.</i> 3. Volatile oil = <i>Myrrhol.</i> 4. Salts.

Nat. Ord. LEGUMINOSÆ.*a. PAPILIONACEÆ.*

Glycyrrhiza Glabra. — Liquorice. — <i>Indigenous.</i>	<i>Glycyrrhiza Radix</i> — <i>Liquorice root.</i> The root-stock or underground stem, fresh and dried.	1. Liquorice sugar or <i>Glycyrrhizine.</i> 2. Asparagine. 5. Gum; mucilage. 4. Acrid resinous oil.
Astragalus Verus. — Milk Vetch. — <i>Asia Minor.</i>	<i>Tragacantha</i> — <i>Tragacanth.</i> A gummy exudation from the stem.	1. <i>Arabin</i> = 53 per cent. 2. <i>Bassorin</i> = 33 per cent. 3. Starch.

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Serothamnus Scoparius. — Broom. — <i>Indigenous.</i> — <i>Europe.</i>	<i>Scoparii Cacumina</i> — <i>Broom tops.</i> The fresh and dried tops.	1. <i>Scoparin</i> = a neu- tral principle. 2. <i>Sparteïn</i> , a vola- tile liquid alkaloid.
Pterocarpus Santalinus. — Red Sandal Wood Tree. — <i>Ceylon.</i> <i>Coromandel.</i>	<i>Pterocarpi Lignum</i> — <i>Red Sandal-wood.</i> The wood in raspings.	1. <i>Santalic acid</i> or <i>Santalin</i> = dark-red and crystalline. 2. <i>Santal.</i> 3. <i>Kino-tannic acid</i> in small quantity.
Pterocarpus Marsupium. — Kino Tree. — <i>Malabar.</i>	<i>Kino.</i> — Inspissated juice from incisions in the trunk.	1. <i>Mimo- Kino- or</i> <i>Catechu-tannic acid</i> = 75 per cent. 2. <i>Catechin.</i> 3. <i>Red gum</i> = about 24 per cent.
Myroxylon Pereiræ. — <i>San Salvador,</i> <i>Central America.</i>	<i>Balsamum Peruvia-</i> <i>num</i> — <i>Balsam of Peru.</i> A balsam exuding from the trunk of the tree, after the bark has been scorched and re- moved.	1. Neutral volatile oil = <i>Cinnamate of</i> <i>Benzyl</i> or <i>Cinnamein</i> = 60 to 70 per cent. 2. <i>Metacinnamein</i> , a crystallizable solid. 3. <i>Cinnamic acid</i> = 6 or 7 per cent. 4. <i>Styracin</i> or <i>Cinna-</i> <i>mate of Cinnyl.</i> 5. Resins, supposed to be produced by the oxidation of the oil; increase with age.

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Myroxylon Toluifera. — <i>Tolu</i> in <i>New Granada</i> .	<i>Balsamum Tolutanum</i> — <i>Balsam of Tolu</i> . A balsam exuding from the trunk of the tree, after incisions have been made in the bark.	Similar to balsam of Peru; also contains <i>Tolene</i> , a volatile oil.
Physostigma Venenosum. — <i>Western Africa</i> .	<i>Physostigmatis Faba</i> — <i>Calabar Bean</i> . The seeds.	1. <i>Physostigmia</i> or <i>Eseria</i> = an alkaloid, in the cotyledons. — The <i>active principle</i> . 2. Starch, legumin, mucilage, etc.

b. CÆSALPINÆ.

Hæmatoxylin Campechianum. — Imported from <i>Campeachy</i> in <i>Central America</i> , from <i>Honduras</i> and <i>Jamaica</i> .	<i>Hæmatoxyli Lig-num</i> — <i>Logwood</i> . The heart-wood, in logs or chips.	1. <i>Hæmatoxyline</i> = crystalline = 9 to 12 per cent. 2. Tannic acid. 3. Resin. 4. Colouring matter.
Cassia Lanceolata. — Cassia Obovata. — Imported from <i>Alexandria</i> .	1. <i>Senna Alexandrina</i> — <i>Alexandrian Senna</i> . Leaflets carefully freed from the flowers, pods, and leaf stalks.	1. A glucoside = <i>Cathartine</i> or <i>Cathartic acid</i> . 2. A yellow substance identical with <i>chrysophanic acid</i> . 3. A crystalline sugar = <i>Cathartomannite</i> . 4. Trace of volatile oil. 5. Tartrate and oxalate of lime and potash.
Cassia Elongata. — Cultivated in <i>Southern India</i> .	2. <i>Senna Indica</i> — <i>Indian</i> or <i>Tinnivelly Senna</i> . The leaflets.	

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents
Cassia Fistula. — Pudding-pipe Tree or Purging Cassia. — <i>E. and W. Indies.</i>	<i>Cassia Pulpa.</i> The pulp from the pods.	1. Cane-sugar = 60 per cent. 2. Mucilage and pectin. 3. A substance ana- logous to tannin. 4. A purgative prin- ciple.
Tamarindus Indica. — <i>E. and W. Indies.</i>	<i>Tamarindus</i> — <i>Ta- marind.</i> The pre- served pulp of the fruit.	1. Malic, citric, and tartaric acids. 2. Cream of tartar. 3. Sugar; gum; &c.
Copaifera (Several species). — Copaiva Trees. — <i>W. Indies and Tropical America;</i> chiefly <i>Valley of the Amazon.</i>	1. <i>Copaiba—Copaiva.</i> An oleo-resin, ob- tained by incision from the trunk. 2. <i>Oleum Copaibæ— Oil of Copaiva.</i> Oil distilled from copaiba.	1. Resin— <i>Copaivic acid</i> = about 52 per cent. 2. Volatile oil = about 40 per cent. 3. Soft brown resin- ous matter = $1\frac{1}{2}$ to 2 per cent., increasing with age.

c. MIMOSÆ.

Acacia Vera, &c. — <i>E. Africa.</i> Imported from <i>Alexandria.</i>	<i>Acacia Gummi</i> — <i>Gum Acacia.</i> A gum- my exudation from the stem of one or more undetermined species of Acacia.	1. <i>Arabic acid</i> or <i>Arabin</i> , combined with lime, magnesia, and potash. 2. Water = about 17 per cent. 3. Various salts, &c.
Indigofera. (Various species). — <i>India.</i>	<i>Indigo.</i> A blue pig- ment prepared from the <i>Indigofera</i> , and introduced in the <i>Ap- pendix</i> for making a test-solution of sul- phate of Indigo.	

Nat. Ord. ROSACEÆ.

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
<p>Amygdalus Communis. Var. Amara, or Bitter Almond, and Dulcis, or Sweet Almond. — <i>Amara</i> chiefly from <i>Mogadore</i>. — <i>Dulcis</i> cultivated about <i>Malaga</i>.</p>	<p>1. <i>Amygdala Amara</i> — <i>Bitter Almond</i>. The seeds. 2. <i>Amygdala Dulcis</i> — <i>Sweet Almond</i>. The seeds. 3. <i>Oleum Amygdala</i> — <i>Oil of Almonds</i>. The oil obtained by <i>bressure</i>, from either sweet or bitter almonds.</p>	<p>1. Oil of Almonds = about 50 per cent. 2. <i>Emulsine</i> in both, — an albuminous principle. 3. Sugar, gum, &c. 4. Salts, chiefly phosphates. 5. <i>Amygdalin</i> — a crystalline glucoside, in <i>bitter almonds</i>. When moistened, amygdalin is acted upon by emulsine, and <i>volatile oil of bitter almonds</i> or <i>hydride of benzoyl</i> and <i>hydrocyanic acid</i> are formed.</p>
<p>Brayera Anthelmintica. — <i>Abyssinia</i>.</p>	<p><i>Cusso</i> — <i>Koussou</i>. The flowers and tops.</p>	<p>1. <i>Koussine</i>, crystallizable. 2. Volatile oil. 3. Gum, sugar, &c.</p>
<p>Prunus Lauro-cerasus. — Cherry Laurel. — <i>Indigenous</i>. Native of <i>Asia Minor</i>.</p>	<p><i>Lauro-cerasi Folia</i> — <i>Cherry Laurel Leaves</i>. The fresh leaves.</p>	<p>1. <i>Amygdalin</i>. 2. <i>Emulsine</i>. 3. Sugar, fat, &c. 4. A little tannic acid.</p> <p>} React as in bitter almonds.</p>
<p>Prunus Domestica. — Plum-tree. — <i>Syria</i> and <i>Europe</i>.</p>	<p><i>Prunum</i> — <i>Prune</i>. The dried fruit or drupe.</p>	<p>1. Glucose, about 25 per cent. 2. Malic acid. 3. Gum, pectin, &c. 4. Purgative principle of unknown nature.</p>

Botanical Source or Name of Plant. Geographical Source.	Official Name = Part of Plant or Product.	Active Principles, and Chief Constituents.
Rosa Canina. — Dog Rose. — <i>Indigenous.</i>	<i>Rosæ Caninæ Fructus.</i> The ripe fruit, or hips.	1. Citric and malic acids, and their salts. 2. Tannic acid. 3. Sugar, gum, &c. 4. Trace of volatile oil.
Rosa Centifolia. — Cabbage Rose. — <i>Indigenous.</i> <i>Cultivated.</i>	<i>Rosæ Centifoliæ Petala.</i> The fresh petals, fully expanded.	1. Volatile oil—attar of roses. 2. A laxative principle. 3. Traces of tannic and gallic acids. 4. Resin, sugar, &c.
Rosa Gallica. — Red Rose. — <i>Indigenous.</i> <i>Cultivated.</i>	<i>Rosæ Gallicæ Petala.</i> The unexpanded petals, fresh and dried.	1. Red colouring matter. 2. Tannic and gallic acids. 3. A glucoside — <i>Quercitrin</i> . 4. Volatile oil and sugar, &c.

Nat. Ord. MYRTACEÆ.

Melaleuca Minor. — Cajuput or Cajeput. — <i>Moluccas.</i> <i>Imported from Batavia and Singapore.</i>	<i>Oleum Cajuputi</i> —Oil of <i>Cajuput</i> . The volatile oil distilled from the leaves.	<i>Hydrate of Cajuputene.</i> A colourless oil obtained by distillation = about $\frac{2}{3}$ ths.
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Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Caryophyllus Aromaticus. — Clove. — <i>E. Indian Islands.</i>	1. <i>Caryophyllum</i> — <i>Cloves.</i> The dried unexpanded flower-bud. 2. <i>Oleum Caryophylli</i> — <i>Oil of Cloves.</i> The volatile oil distilled in Britain from cloves.	1. Volatile oil = 18 per cent. 2. Salicylic acid. 3. Resin. 4. Tannin.
Punica Granatum — Pomegranate. — <i>Mediterranean Coast.</i>	<i>Granati Radicis Cortex</i> — <i>Pomegranate root bark.</i> The dried bark of the root.	1. Punico-tannic acid = 20 per cent. 2. Gallic acid. 3. Mannite. 4. <i>Punicine.</i>
Eugenia Pimenta. — All-spice-tree. — <i>West Indies.</i>	1. <i>Pimenta</i> — <i>Pimento.</i> The dried unripe fruit = berries. 2. <i>Oleum Pimenta</i> — <i>Oil of Pimento.</i> Oil distilled in Britain from pimento.	1. Volatile oil. 2. Fixed oil. 3. Resin. 4. Much tannin.

Nat. Ord. CUCURBITACEÆ.

Citrullus Colocynthis. — Colocynth. — <i>India, Levant.</i> — Imported chiefly from <i>Smyrna, Trieste, France, and Spain.</i>	<i>Colocynthisidis Pulpa</i> — <i>Colocynth pulp.</i> The dried and decorticated fruit = pepo, freed from the seeds.	1. <i>Colocynthin.</i> A crystalline glucoside. 2. <i>Colocynthisin</i> — crystalline. 3. Bitter resin. 4. A bitter principle. 5. Salts.
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Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Ecballium Officinatum. — Squirting Cucumber. — <i>Southern Europe.</i>	1. <i>Ecballii Fructus</i> — <i>Squirting Cucumber</i> <i>fruit.</i> The fruit = pepo, very nearly ripe. 2. <i>Elaeterium.</i> Sedi- ment from the ex- pressed juice of the squirting cucumber.	{ 1. <i>Elaeterin, elatin,</i> or <i>momordicine</i> , the active principle, in colourless crystals, not less than 20 per cent. . 2. Green resin.

Nat. Ord. UMBELLIFERÆ.

Conium Maculatum — Spotted Hemlock. — <i>Indigenous.</i>	1. <i>Conii Folia</i> — <i>Hemlock Leaves.</i> <i>a.</i> The fresh leaves and young branches, gathered in June, from wild British plants, when the fruit begins to form. <i>b.</i> The leaves care- fully dried. 2. <i>Conii Fructus</i> — <i>Hemlock Fruit.</i> The ripe fruit, gathered in July, dried.	1. <i>Conia</i> , a volatile liquid alkaloid. 2. <i>Methyl-conia</i> , an alkaloid. 3. <i>Conic acid</i> , com- bined with conia. 4. <i>Conhydrine</i> , a base. 5. Non-poisonous volatile oil, with odour.
Anethum Graveolens. — Dill. — <i>Central and</i> <i>Southern Europe.</i> <i>Cultivated in</i> <i>Britain.</i>	1. <i>Anethi Fructus</i> — <i>Dill Fruit.</i> The dried fruit (cremocarp). 2. <i>Oleum Anethi</i> — <i>Oil of Dill.</i> The volatile oil distilled in Britain from the fruit.	Volatile oil.

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Pimpinella Anisum. — Anise. — <i>Europe.</i>	<i>Oleum Anisi—Oil of Anise.</i> The oil distilled in Europe from the fruit = 2 per cent. Also obtained in China from fruit of <i>Illicium Anisatum</i> (see MAGNOLIACEÆ).	
Carum Carui. — Caraway. — <i>Indigenous. Mid-Europe.</i> Cultivated in <i>England and Germany.</i>	1. <i>Carui Fructus—Caraway fruit.</i> The dried fruit. 2. <i>Oleum Carui—Oil of Caraway.</i> The volatile oil distilled in Britain from the fruit = 3 to 6 per cent.	Volatile oil.
Coriandrum Sativum. — Coriander. — <i>Indigenous. Europe.</i>	1. <i>Coriandri Fructus—Coriander fruit.</i> The ripe fruit, dried. 2. <i>Oleum Coriandri—Oil of Coriander.</i> The volatile oil distilled in Britain from the fruit.	Volatile oil.
Foeniculum Dulce. — Fennel. — <i>Southern Europe.</i> Imported from <i>Malta.</i>	<i>Fœniculi Fructus—Fennel fruit.</i> The ripe fruit, dried.	Volatile oil.
Dorema Ammoniacum. — <i>Punjaub and Persia.</i>	<i>Ammoniacum.</i> — A gum-resinous exudation from all parts of the plant.	1. Resin = about 70 per cent. 2. Gum = about 20 per cent. 3. Volatile oil = about 4 per cent.

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Warthez Assafetida. — <i>Affghanistan and the Punjaub.</i> Imported from <i>Bombay.</i>	<i>Assafetida.</i> A gum-resin, exuding from the incised living root.	1. Resin = 65 per cent. 2. Gum = 25 per cent. 3. Volatile oil, chiefly <i>Sulphide of Allyl</i> , = about 4 per cent.
Ferula Galbaniflua. — <i>India; Levant.</i>	<i>Galbanum.</i> A gum-resin.	1. Resin = about 65 per cent. 2. Gum. 3. Volatile oil = about 3·5 per cent.; does not contain sulphur.
Euryangium Sumbul. — Musk Root. — <i>Central Asia.</i>	<i>Sumbul Radix</i> — <i>Sumbul Root.</i> The dried root in slices.	1. Balsamic resin = 9 per cent. 2. Volatile oil. 3. Umbelliferone.

C. COROLLIFLORÆ.

Nat. Ord. CAPRIFOLIACEÆ.

Sambucus Nigra. — Elder. — <i>Indigenous.</i>	<i>Sambuci Flores</i> — <i>Elder flowers.</i> The fresh flowers.	Volatile oil.
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Nat. Ord. RUBIACEÆ or CINCHONACEÆ.

Uncaria Gambir. — <i>Singapore.</i>	<i>Catechu Pallidum</i> — <i>Pale Catechu.</i> An extract of the leaves and young shoots.	1. Catechu - tannic acid. 2. Catechin or Catechuic acid. 3. Mucilage. 4. Extractive matter.
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Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Cinchona Succirubra. — Red Cinchona. — <i>Chimborazo.</i>	<i>Cinchona Rubra</i> <i>Cortex—Red Cinchona</i> <i>Bark. (Yields not less</i> <i>than 1·5 per cent. of</i> <i>alkaloids).</i>	1. <i>Alkaloids.</i> <i>a. Quinia, chiefly</i> <i>in yellow bark,</i> <i>not less than 2</i> <i>per cent.</i> <i>b. Quinidia.</i> <i>c. Cinchonina, chief-</i> <i>ly in pale bark.</i> <i>d. Cinchonidia.</i> 2. <i>Acids.</i> <i>a. Quinic.</i> <i>b. Cincho-tannic.</i> <i>c. Cincho-fulvic.</i> <i>d. Quinovic.</i> 3. <i>Tannin.</i> 4. <i>Starch, gum, oil,</i> <i>etc.</i>
Cinchona Condaminea. — Pale Cinchona. — <i>About Loja in</i> <i>Ecuador.</i>	<i>Cinchona Pallida</i> <i>Cortex—Pale Cinchona</i> <i>Bark. (Yields not less</i> <i>than 0·5 per cent. of</i> <i>alkaloids).</i>	
Cinchona Calisaya. — Yellow Cinchona. — <i>Bolivia and Peru.</i>	<i>Cinchona Flava</i> <i>Cortex—Yellow Cin-</i> <i>chona Bark. (Yields</i> <i>not less than 2 per</i> <i>cent. of Quinine).</i>	
Cinchona Lancifolia. — <i>New Granada.</i>	<i>Quinia Sulphas—</i> <i>Sulphate of Quinia.</i> <i>Prepared from Cin-</i> <i>chona Calisaya and</i> <i>Lancifolia.</i>	
Cephaelis Ipecacuanha. — Ipecacuanha. — <i>Brazil.</i>	<i>Ipecacuanha.</i> The <i>dried root.</i>	1. <i>Emetine, a feeble</i> <i>alkaloid, almost en-</i> <i>tirely in the bark, =</i> <i>about 1 per cent.</i> 2. <i>Cephaelic or Ipe-</i> <i>cacuanhic acid.</i>

Nat. Ord. **VALERIANACEÆ.**

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Valeriana Officinalis. — Valerian. — <i>Indigenous.</i>	<i>Valerianæ Radix</i> — <i>Valerian Root.</i> The rhizome and roots, collected in autumn and dried; from wild plants, and growing on dry soil preferred.	1. Volatile oil = $\frac{1}{2}$ to 2 per cent. 2. Yields about 5 per cent. of valerianic acid, when distilled with water. 3. Resin, gum, ex- tractive, &c.

Nat. Ord. **COMPOSITE.**

Anthemis Nobilis. — Chamomile. — <i>Indigenous.</i>	1. <i>Anthemidis Flores</i> — <i>Chamomile flowers.</i> The dried flower-heads, single and double, wild and cultivated. 2. <i>Oleum Anthemidis</i> — <i>Oil of Chamomile.</i> The volatile oil, dis- tilled in Britain from the flowers.	1. Volatile oil. 2. Bitter extractive. 3. Tannin in small quantity.
Arnica Montana. — Leopard's bane. — Mountainous parts of <i>Central</i> and <i>Southern</i> <i>Europe.</i>	<i>Arnica Radix</i> — <i>Ar-</i> <i>nica Root.</i> The rhi- zome and rootlets, dried.	1. <i>Arnica</i> = a bit- ter resin. 2. Volatile oil. 3. Trimethylamine.
Lactuca Virosa. — Wild Lettuce. — <i>Indigenous.</i>	<i>Lactuca</i> — <i>Lettuce.</i> The flowering herb of the wild plant.	1. Lactucic acid. 2. Lactucin } crystal- 3. Lactucine } line. 4. Bitter extractive. 5. Resin, sugar, &c.

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Anacyclus Pyrethrum. — Pellitory of Spain. — <i>Morocco; Spain; Levant.</i>	<i>Pyrethri Radix</i> — <i>Pellitory Root.</i> The dried root, in pieces.	1. Resins = <i>Pyrethrin</i> or <i>Pyrethric Acid</i> ; and another. 2. Tannin, gum, &c. 3. Yellow, acrid oil.
Artemisia. (Species uncertain). — <i>Russia.</i>	1. <i>Santonica.</i> The unexpanded flower-heads. 2. <i>Santoninum</i> — <i>Santonin.</i> A crystalline neutral principle.	1. <i>Santonin</i> = $1\frac{1}{2}$ to 2 per cent. 2. Volatile oil.
Taraxacum Dens Leonis. — Dandelion. — <i>Indigenous.</i>	<i>Taraxaci Radix</i> — <i>Dandelion Root.</i> The fresh and dried root, gathered between September and February, from meadows and pastures in Britain.	1. Bitter extractive. 2. <i>Taraxacin</i> = crystalline. 3. Resin, &c.

Nat. Ord. LOBELIACEÆ.

Lobelia Inflata. — Indian Tobacco. — <i>N. America.</i>	<i>Lobelia.</i> The dried flowering herb.	1. <i>Lobelic acid</i> = volatile oil. 2. <i>Lobelina</i> = volatile liquid alkaloid.
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Nat. Ord. ERICACEÆ.

Arctostaphylos Uva Ursi. — Bearberry. — <i>Europe.</i> <i>Indigenous.</i>	<i>Uva Ursi Folia</i> — <i>Bearberry Leaves.</i> The dried leaves.	1. Tannic acid = about 36 per cent. 2. Gallic acid. 3. <i>Arbutine</i> } crys- 4. <i>Ursine</i> } talline.
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Nat. Ord. SAPOTACEÆ.

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Isonandra Gutta. — Gutta-Percha Tree. — <i>Eastern Archipelago; Borneo; Sumatra.</i>	<i>Gutta-Percha.</i> The dried concrete juice.	1. <i>Gutta</i> = 80 per cent. 2. Resins.

Nat. Ord. STYRACACEÆ.

Styrax Benzoin. — Benjamin Tree. — <i>Eastern Archipelago; Siam; Sumatra.</i>	1. <i>Benzoinum</i> — <i>Benzoin.</i> A balsamic resin, exuding from incisions made in the bark. 2. <i>Acidum Benzoicum</i> — <i>Benzoic acid.</i> The acid obtained from Benzoin by sublimation.	1. Benzoic acid = 10 to 20 per cent. 2. Resin.
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Nat. Ord. OLEACEÆ.

Olea Europæa. — Olive. — <i>S. Europe.</i>	<i>Oleum Olivæ</i> — <i>Olive Oil.</i> The oil expressed in the south of Europe from the ripe fruit.	1. <i>Oleine</i> = 27 per cent. 2. <i>Margarine</i> } <i>Palmi-</i> = 28 per cent. } <i>tine.</i> } <i>Stear-</i> } <i>ine.</i> (Compounds of glycerine with acids).
Fraxinus Ornus and Rotundifolia. — <i>Calabria; Sicily.</i>	<i>Manna.</i> A concrete saccharine exudation from the incised bark.	1. Mannite = 60 to 80 per cent. 2. Small quantity of bitter matter. 3. Extractive and sugar.

Nat. Ord. ASCLEPIADACEÆ.

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Hemidesmus Indicus. — Indian Sarsaparilla. — <i>India.</i>	<i>Hemidesmi Radix</i> — <i>Hemidesmus Root.</i> The dried root.	<i>Hemidesmic acid.</i> Volatile and crystallizable.

Nat. Ord. LOGANIACEÆ.

Strychnos Nux Vomica. — Kocchia Tree. — <i>East Indies.</i>	1. <i>Nux Vomica.</i> The seeds. 2. <i>Strychnia.</i> An alkaloid obtained from <i>Nux Vomica.</i>	$\left. \begin{array}{l} 1. \textit{Strychnia} \\ 2. \textit{Brucia} \\ 3. \textit{Igasuria} \end{array} \right\} = \text{alkaloids.}$ 4. <i>Igasuric</i> or <i>strychnic acid.</i>
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Nat. Ord. GENTIANACEÆ.

Ophelia Chirata. — Chiretta. — <i>N. India.</i>	<i>Chirata</i> — <i>Chiretta.</i> The entire plant, collected when the fruit begins to form.	1. <i>Ophelic acid.</i> 2. <i>Chiratin</i> = a bitter resin.
Gentiana Lutea. — Gentian. — <i>European Mountains. Pyrenees.</i>	<i>Gentiana Radix.</i> — <i>Gentian Root.</i> The dried root.	1. <i>Gentianic acid.</i> Crystalline. 2. <i>Gentianin.</i> Neutral, crystalline. The active principle. 3. Sugar, volatile oil, gum. (Not starch or tannic acid).

Nat. Ord. CONVULVULACEÆ.

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles and Chief Constituents.
Exogonium Purga. — Jalap. — <i>Mexico.</i>	1. <i>Jalapa</i> — <i>Jalap.</i> The dried tubercles. 2. <i>Jalapæ Resina</i> — <i>Jalap Resin.</i> Ex- tracted from jalap, by means of rectified spirit.	{ 1. Resin = about 18 per cent. 2. Sugar, starch, gum, &c. 1. <i>Convolvulin.</i> An acid glucoside. 2. <i>Jalapin</i> or <i>Jala-</i> <i>pic acid.</i> A resin soluble in ether.
Convolvulus Scammonia. — Scammony. — <i>Asia Minor and</i> <i>Syria.</i>	1. <i>Scammonia Ra-</i> <i>dix</i> — <i>Scammony root.</i> The dried root. 2. <i>Scammonium</i> — <i>Scammony.</i> A gum- resin obtained by inci- sion from the living root; collected in shells. 3. <i>Scammonia Re-</i> <i>sina</i> — <i>Scammony resin.</i> Made by a special process, from the root or from scammony.	{ 1. Resin = about 4 per cent. 2. Gum = 6 per cent. 3. Sugar, starch, ex- tractive, &c. 1. Resin = 80 to 90 per cent. 2. Gum.

Nat. Ord. SOLANACEÆ.

Capsicum Fastigiatum. — Chillies. — <i>Zanzibar.</i>	<i>Capsici Fructus</i> — <i>Capsicum fruit.</i> The dried ripe fruit=pods.	1. <i>Capsicin</i> =a crys- talline alkaloid; vola- tile, acrid. 2. Red colouring matter.
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Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Solanum Dulcamara. — Woody Night-Shade; Bitter-Sweet. — <i>Indigenous.</i>	<i>Dulcamara.</i> The dried young branches or twigs, collected in Autumn, when devoid of leaves.	1. <i>Solanina.</i> An alkaloid. 2. <i>Dulcamarine.</i> A bittersweetish extract.

Nat. Ord. ATROPACEÆ.

Atropa Belladonna. — Deadly Night-Shade. — <i>Indigenous.</i>	1. <i>Belladonnæ Folia.</i> <i>a.</i> The fresh leaves and the branches to which they are attached. <i>b.</i> The leaves separated, carefully dried, gathered in June when the fruit has begun to form, from wild or cultivated plants in Britain. 2. <i>Belladonnæ Radix.</i> The dried root, collected in early spring. 3. <i>Atropia.</i> An alkaloid obtained from <i>Belladonna</i> . 4. <i>Atropiæ Sulphas</i> — <i>Sulphate of Atropia.</i>	1. <i>Atropia</i> , the active alkaloid, in all parts. 2. <i>Asparagine</i> , in the leaves. 3. <i>Belladonin</i> = an amorphous alkaloid, in the root.
Hyoscyamus Niger. — Henbane. — <i>Indigenous.</i>	<i>Hyoscyami Folia</i> — <i>Hyoscyamus Leaves.</i> <i>a.</i> The fresh leaves and small branches, collected when about $\frac{3}{4}$ of its flowers are expanded. <i>b.</i> The leaves carefully dried.	1. <i>Hyoscyamia</i> , an alkaloid. 2. Malic acid.

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Datura Stramonium. — Thorn Apple. — <i>Indigenous.</i>	1. <i>Stramonii Folia</i> — <i>Stramonium Leaves.</i> The leaves, collected when the plant is in flower, dried. 2. <i>Stramonii Semina.</i> The ripe seeds.	1. <i>Daturia</i> , an alkaloid. 2. Malic acid.
Nicotiana Tabacum. — Tobacco. — <i>Tropical America.</i>	<i>Tabaci Folia</i> — <i>Tobacco Leaves.</i> The dried leaves.	1. <i>Nicotine</i> , a colourless volatile alkaloid. 2. <i>Nicotianin</i> , a concrete volatile oil.

Nat. Ord. SCROPHULARIACEÆ.

Digitalis Purpurea. — Foxglove. — <i>Indigenous.</i>	1. <i>Digitalis Folia</i> — <i>Digitalis Leaves.</i> The dried leaves, gathered from wild plants, when about $\frac{3}{4}$ ds of flowers are expanded. 2. <i>Digitalinum.</i> The active principle obtained from digitalis.	1. <i>Digitalin</i> = bitter, neutral, non-nitrogenized. 2. <i>Digitalein</i> = active, bitter, amorphous.
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Nat. Ord. LABIATÆ.

Lavandula Vera. — Lavender. — <i>Indigenous.</i>	<i>Oleum Lavandulæ</i> — <i>Oil of Lavender.</i> Volatile oil distilled in Britain from the flowers.	
Mentha Piperita. — Peppermint. — <i>Indigenous.</i>	<i>Oleum Menthe Piperitæ</i> — <i>Oil of Peppermint.</i> Volatile oil distilled in Britain from the fresh flowering plant.	

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Mentha Viridis. — Spearmint. — <i>Indigenous.</i>	<i>Oleum Menthæ Viridis</i> — <i>Oil of Spearmint.</i> Volatile oil distilled in Britain from the fresh flowering plant.	
Rosmarinus Officinalis. — Rosemary. — <i>S. Europe.</i>	<i>Oleum Rosmarini</i> — <i>Oil of Rosemary.</i> Volatile oil distilled from the flowering tops.	

D. MONOCHLAMYDEÆ.

Nat. Ord. POLYGONACEÆ.

Rheum. (Species uncertain). — Rhubarb. — <i>China, Chinese Tartary, and Thibet.</i>	<i>Rhei Radix</i> — <i>Rhubarb Root.</i> The dried root, deprived of its bark.	1. <i>Chrysophanic acid</i> = yellow. 2. Oxalate of lime = 35 to 40 per cent. 3. Tannic and gallic acids. 4. A bitter substance. 5. Resin.
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Nat. Ord. THYMELACEÆ.

Daphne Mezereum or Laureola. — Spurge Laurel. — <i>Indigenous.</i>	<i>Mexerei Cortex</i> — <i>Mexereon Bark.</i> The dried bark.	1. <i>Daphnin</i> , a crystallizable glucoside. 2. Volatile oil. 3. Acrid resin.
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Nat. Ord. MYRISTICACEÆ.

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Myristica Officinalis. — Nutmeg. — <i>Eastern</i> <i>Archipelago.</i> — Imported from <i>Sumatra</i> , and the <i>Molucca Islands</i> .	1. <i>Myristica</i> — <i>Nutmeg</i> . The kernel of the seeds. 2. <i>Oleum Myristica</i> — <i>Oil of Nutmeg</i> . The volatile oil distilled in Britain from nutmegs. 3. <i>Oleum Myristica Expressum</i> — <i>Expressed oil of nutmeg</i> . A concrete oil obtained from nutmeg by expression and heat.	1. Volatile oil. 2. Fatty acids, especially <i>Myristicin</i> .

Nat. Ord. LAURACEÆ.

Camphora Officinarum. — Camphor Plant. — <i>China; Japan.</i>	<i>Camphora</i> — <i>Camphor</i> . A concrete volatile oil obtained from the wood, and purified in this country by sublimation.	
Cinnamomum Zeylanicum. — Cinnamon. — <i>Ceylon.</i>	1. <i>Cinnamomi Cortex</i> — <i>Cinnamon Bark</i> . The inner bark of shoots from the truncated stocks. 2. <i>Oleum Cinnamomi</i> — <i>Oil of Cinnamon</i> . The volatile oil distilled from cinnamon bark.	1. Volatile oil. 2. Tannic acid. 3. Cinnamic acid. 4. Resin.
Nectandra Rodizi. — Bebeeru or Greenheart Tree. — <i>British Guiana.</i>	1. <i>Nectandra Cortex</i> — <i>Bebeeru bark</i> . The bark. 2. <i>Beberia Sulphas</i> — <i>Sulphate of Beberia</i> . Prepared from the <i>Bebeeru bark</i> .	1. <i>Beberia</i> } alkalis. 2. <i>Nectandra</i> } 3. Tannic acid. 4. Resin, &c.

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Sassafras Officinale. — <i>N. America.</i>	<i>Sassafras Radix</i> — <i>Sassafras</i> root.—The dried root.	1. Volatile oil. 2. Tannic acid. 4. Red colouring matter.

Nat. Ord. ARISTOLOCHIEÆ.

Aristolochia Serpentaria. — Serpentary. — <i>Virginia ;</i> <i>United States.</i>	<i>Serpentaria Radix</i> — <i>Serpentary</i> root. The dried rhizome and rootlets.	1. Volatile oil. 2. Resin. 3. Tannic acid. 4. Amorphous bitter extractive matter.
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Nat. Ord. EUPHORBIACEÆ.

Croton Eluteria. — Cascarilla. — <i>Bahamas.</i>	<i>Cascarilla Cortex</i> — <i>Cascarilla</i> Bark. The dried bark.	1. <i>Cascarillin</i> = bitter, neutral, crystalline. 2. Resin. 3. Tannic acid. 4. Volatile oil.
Croton Tiglium. — Croton Oil Plant. — <i>East India.</i>	<i>Oleum Crotonis</i> — <i>Croton</i> Oil.—The oil expressed from the seeds.	1. Ordinary fatty acids. 2. Acetic, butyric, valerianic acids. 3. <i>Tiglinic</i> and <i>crotonic</i> acids.
Rottleria Tinctoria. — Wurru. — <i>India.</i>	<i>Kamala</i> . A powder consisting of minute glands adhering to the capsules. Fine, granular, mobile, orange-red.	1. Resin = <i>Rottlerin</i> = 80 per cent. 2. Tannic acid. 3. Volatile oil.
Ricinus Communis. — Castor Oil Plant. — <i>E. India and America.</i>	<i>Oleum Ricini</i> — <i>Castor</i> Oil. The oil expressed from the seeds.	1. Ricinate 2. Ricin- 3. Ricin- 4. Acrid resin. stearate } of glycerine.

Nat. Ord. **PIPERACEÆ.**

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Cubeba Officinalis. — <i>Java.</i>	1. <i>Cubeba—Cubeb.</i> The dried unripe fruit. 2. <i>Oleum Cubebæ.</i> The volatile oil distilled in Britain from cubeb.	1. Volatile oil. 2. <i>Cubebin</i> =crystalline, inert. 3. <i>Cubebic acid.</i> 4. Resin, gum, &c.
Artanthe Elongata—Piper Angustifolium. — Matico. — <i>Peru.</i>	<i>Matica Foliæ—Matico Leaves.</i> The dried leaves.	1. <i>Artanthic acid</i> = crystalline. 2. Volatile oil and resin. 3. Trace of tannic acid.
Piper Nigrum. — Black Pepper. — <i>East Indies.</i>	<i>Piper Nigrum</i> — <i>Black pepper.</i> The dried unripe berries.	1. Acrid resin. 2. Volatile oil. 3. <i>Piperin</i> =neutral.

Nat. Ord. **MORACEÆ.**

Morus Nigra. — Mulberry. — <i>Indigenous.</i>	<i>Mori Succus—Mulberry Juice.</i> The deep purple juice of the ripe fruit.	1. Sugar. 2. Malic acid. 3. Gum, pectin, salts, &c.
Ficus Carica. — Fig Tree. — <i>Smyrna.</i>	<i>Ficus — Fig.</i> The dried fruit.	Saccharine and mucilaginous matters.

Nat. Ord. CANNABINACEÆ.

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Cannabis Sativa. — <i>India.</i>	<i>Cannabis Indica</i> — <i>Indian Hemp</i> . The dried flowering tops of the female plant, from which the resin has not been removed.	1. Resin = <i>Canna-</i> <i>bin</i> . 2. Volatile oil.
Humulus Lupulus. — Hop. — <i>Indigenous.</i>	<i>Lupulus</i> — <i>Hop</i> . The dried catkins or strobiles of the female plant. Minute yellow grains at the base of the scales = <i>Lupulin</i> .	1. Volatile oil. 2. Resin and gum. 3. Tannic acid. 4. <i>Lupulite</i> or <i>Humu-</i> <i>lin</i> = bitter principle.

Nat. Ord. ULMACEÆ.

Ulmus Campestris. — Elm Tree. — <i>Indigenous.</i>	<i>Ulm</i> <i>Cortex</i> — <i>Elm Bark</i> . The dried inner bark, deprived of the outer layer.	1. Gum and mucilage = 20 per cent. 2. Tannic acid = 3 per cent. 3. Resin.
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Nat. Ord. CUPULIFERÆ.

Quercus Pedunculata. — Common Oak. — <i>Indigenous.</i>	<i>Quercus Cortex</i> — <i>Oak Bark</i> . The dried bark of the small branches and young stems, collected in spring.	1. <i>Querc</i> -tannic acid. 2. Sugar, pectin, &c.
Quercus Infectoria. — Gall, or Dyer's Oak. — <i>Asia Minor.</i>	<i>Galla</i> — <i>Galls</i> . Excrescences on the <i>Quercus infectoria</i> , caused by the puncture and deposited ova of the <i>Diplolepis Galla</i> <i>Trinctoria</i> , a Hymenopterous insect.	1. Tannic acid = 35 per cent. 2. Gallic acid = 5 per cent. 3. Ellagic acid = crystalline. 4. Gum, starch, &c.

Nat. Ord. **LIQUIDAMBARACEÆ.**

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Liquidambar Orientale. — <i>Asia Minor.</i>	<i>Styrax Præparatus</i> — <i>Prepared Storax.</i> A balsam prepared from the bark, purified by means of rectified spirit and straining.	1. Resin. 2. Volatile oil= <i>Styracol.</i> 3. Cinnamic acid. 4. <i>Styracin</i> = solid and crystalline.

E. GYMNOSPERMEÆ.

Nat. Ord. **CONIFERÆ or PINACEÆ.**

Juniperus Communis. — Juniper. — <i>N. Europe.</i>	<i>Oleum Juniperi</i> — <i>Oil of Juniper.</i> Volatile oil distilled in Britain from the unripe fruit.	
Juniperus Sabina. — Savin. — <i>Indigenous.</i>	1. <i>Sabinæ Cacumina</i> — <i>Savin tops.</i> The fresh and dried tops, collected in spring. 2. <i>Oleum Sabinæ</i> — <i>Oil of Savin.</i> The volatile oil distilled from the fresh tops.	1. Volatile oil. 2. Resin. 3. Gallic acid.
Larix Europæa. — Larch. — <i>Europe.</i>	<i>Laricis Cortex</i> — <i>Larch Bark.</i> The inner bark.	1. Turpentine. 2. Gum. 3. Tannic acid. 4. <i>Larixin</i> or <i>Larixynic acid</i> = crystalline.
Abies Hæcelsa. — Spruce Fir. — <i>Switzerland.</i>	<i>Pix Burgundica</i> — <i>Burgundy Pitch.</i> A resinous exudation from the stem, melted and strained.	1. Resin. 2. A little volatile oil.

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Abies Balsamea. — Balm of Gilead Fir. — <i>Canada.</i>	<i>Terebinthina Canadensis</i> — <i>Canada Balsam.</i> The turpentine or oleo-resin obtained from the stem by incision.	1. Resin. 2. Volatile oil.
Pinus Palustris, Tæda, Pinaster, &c. — <i>America ; France.</i>	1. <i>Thus Americanum</i> — <i>Common Frankincense.</i> The concrete turpentine from natural fissures in the bark of the <i>Pinus Palustris</i> and <i>Tæda</i> . 2. <i>Oleum Terebinthinæ</i> — <i>Oil or Spirit of Turpentine.</i> The volatile oil distilled from the oleo-resin (<i>Common Turpentine</i>), which exudes from <i>Pinus Palustris</i> , <i>Pinaster</i> , and <i>Tæda</i> . 3. <i>Resina</i> — <i>Resin.</i> The residue of the distillation of the turpentine from various species of <i>Pinus</i> and <i>Abies</i> .	{ 1. Resin. 2. Volatile oil = about 17 per cent. { <i>Acids</i> =Pinic, Sylvic, and Pimaric.
Pinus Sylvestris, &c. — Scotch Pine. — <i>Northern Europe.</i>	<i>Pix Liquida</i> — <i>Tar.</i> A bituminous liquid obtained from <i>Pinus sylvestris</i> and other pines, by destructive distillation.	1. Oil of turpentine, creosote and other compounds obtained by distillation. 2. Pitch remains = black resin.

II. ENDOGENÆ—ENDOGENS.

Nat. Ord. SMILACÆÆ.

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Smilax Officinalis. — Sarsaparilla. — <i>Central America</i> <i>and Jamaica.</i>	<i>Sarsæ Radix</i> — <i>Sarsaparilla</i> Root. The dried root.	1. <i>Sarsaparillin</i> or <i>Smilacin</i> = neutral, crystalline, bitter. 2. Volatile oil. 3. Starch, &c.

Nat. Ord. ZINGIBERACÆÆ.

Elektaria Cardamomum. — Cardamoms. — <i>Malabar.</i>	<i>Cardamomum</i> — <i>Cardamoms</i> . The seeds, contained in their dried capsules or pericarps. The seeds only are used.	1. Volatile oil. 2. Acrid resin. 3. Colouring matter.
Zingiber Officinale. — Ginger. — <i>E. and W. Indies.</i>	<i>Zingiber</i> — <i>Ginger</i> . The rhizome, scraped and dried.	1. Volatile oil. 2. Resinous matter. 3. Starch, &c.
<i>(In Appendix).</i> Curcuma Longa. — <i>Ceylon.</i>	<i>Curcuma</i> — <i>Turmeric</i> . The dried rhizome.	1. Volatile oil. 2. <i>Curcumin</i> = yellow colouring matter.

Nat. Ord. IRIDACÆÆ.

Crocus Sativus. — Crocus. — <i>S. Europe.</i>	<i>Crocus</i> — <i>Saffron</i> . The dried stigma and part of the style of the flower.	Colouring matter.
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Nat. Ord. **LILIACEÆ.**

Botanical Source or Name of Plant. Geographical Source	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Aloe Vulgaris. — Barbadoes Aloe. — <i>E. and W. Indies;</i> <i>Barbadoes.</i> — Undetermined Species. <i>Socotra.</i>	1. <i>Aloe Barbadensis</i> — <i>Barbadoes Aloe.</i> The inspissated juice of the cut leaf. 2. <i>Aloe Socotrina</i> — <i>Socotrine Aloe.</i> The inspissated juice of the leaf of one or more undetermined species of <i>Aloe</i> . Not defin- itely known how pre- pared, probably by boiling.	1. <i>Aloin</i> of various kinds = crystalline and amorphous. 2. Resin, especially in <i>Socotrine</i> . 3. <i>Aloetic acid</i> . 4. Trace of volatile oil.
Urginea Scilla. — Squill. — <i>S. Europe.</i>	<i>Scilla</i> — <i>Squill.</i> The bulb, sliced and dried.	1. Bitter resinous extractive. 2. <i>Scillitin</i> . 3. Peculiar acrid re- sin. 4. Trace of tannic acid.

Nat. Ord. **MELANTHACEÆ.**

Colchicum Autumnale. — Meadow Saffron. — <i>Indigenous.</i>	1. <i>Colchici Cormus</i> — <i>Colchicum Corm.</i> The fresh corm, col- lected about the end of June or early in July, stripped of its coats, sliced transversely, and dried under 150°. 2. <i>Colchici Semina</i> . The seeds, fully ripe, gathered about the end of July.	1. <i>Colchicine</i> = crys- talline. 2. <i>Cevadic acid</i> . 3. Gum, starch, &c.
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Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Asagraea Officialis. — <i>Mexico.</i>	1. <i>Sabadilla</i> — <i>Cevadilla</i> . The dried fruit with the contained seeds. 2. <i>Veratria</i> . The alkaloid obtained from <i>Sabadilla</i> .	1. <i>Veratria</i> . 2. <i>Sabadilline</i> . 3. Acids { Gallic. Veratric. Cevadic.
Veratrum Viride. — Green Hellebore. — <i>N. America.</i>	<i>Veratri Viridis Radix</i> — <i>Green Hellebore root</i> . The rhizome, collected in autumn, and dried.	1. <i>Veratria</i> } alka- 2. <i>Viridia</i> } loids.

Nat. Ord. PALMACEÆ.

Areca Catechu. — Betel Nut. — <i>India.</i>	<i>Areca</i> — <i>Areca Nut</i> . The seed.	1. Catechu-tannic acid. 2. Gallic acid. 3. Oily matter. 4. Areca-red.
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Nat. Ord. GRAMINACEÆ.

Triticum Vulgare. — Wheat. — <i>Indigenous.</i>	1. <i>Farina Triticæ</i> — <i>Wheaten Flour</i> . The grain, ground and sifted. 2. <i>Amylum</i> — <i>Starch</i> . Separated from the seeds of common wheat. 3. <i>Mica panis</i> — <i>Crumb of bread</i> .	1. Starch=about 70 per cent. 2. Gluten=about 10 per cent. 3. Gum, sugar, salts, &c.
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Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Hordeum Distichon. — Barley. — <i>Indigenous.</i>	<i>Hordeum Decortiatum</i> — <i>Pearl Barley.</i> The husked seeds.	Gluten, starch, gum, sugar, salts, &c.
Saccharum Officinatum. — Sugar Cane. — <i>W. Indies.</i>	1. <i>Saccharum Purificatum</i> — <i>Refined Sugar.</i> Pure cane-sugar. 2. <i>Theriaca</i> — <i>Treacle.</i> The uncrystallized residue of the refining of sugar.	
Secale Cereale. — Common Rye. — <i>Indigenous.</i>	<i>Ergota</i> — <i>Ergot.</i> The sclerotium (compact mycelium or spawn) of a vegetable fungus, the <i>Claviceps Purpurea</i> , growing within the paleæ of the rye.	1. <i>Sclerotic</i> or <i>Sclerotinic acid</i> , the active principle—about 4 per cent. 2. Bases { <i>Ecboline</i> } { <i>Ergotine</i> } in combination with 3. <i>Ergotic acid.</i> 4. Fixed oil = 30 per cent. 5. Resin.

III. ACROGENS.

Nat. Ord. FILICES.

Aspidium Filix Mas. — Male Fern. — <i>Indigenous.</i>	<i>Filix Mas</i> — <i>Malefern.</i> The dried rhizome, with the bases of the foot-stalks and portions of the root-fibres, collected late in summer or autumn.	1. Volatile oil. 2. Fixed oils. 3. Resin, gum, starch, &c. 4. Tannin.
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Nat. Ord. FUNGI.

Botanical Source or Name of Plant. Geographical Source.	Official Nature = Part of Plant or Product.	Active Principles, and Chief Constituents.
Torula Cerevisia. — Yeast Plant.	<i>Cerevisia Fermentum</i> — <i>Beer Yeast</i> . The ferment obtained in brewing beer.	

Nat. Ord. LICHENES.

Cetraria Islandica. — Iceland Moss. — <i>North Europe.</i>	<i>Cetraria</i> — <i>Iceland Moss</i> . The entire lichen.	1. <i>Lichenin</i> or lichen starch. 2. <i>Cetraric acid</i> . 3. Bitter principle = crystalline.
Roccella Tinctoria, &c. — <i>The Azores.</i>	<i>Lacmus</i> — <i>Litmus</i> . (In <i>Appendix</i>). A blue pigment prepared from various species.	

GROUPS OF VEGETABLE DRUGS.

The student, having obtained a general knowledge of the vegetable drugs from the preceding TABLES, may now proceed to study them more particularly, according to certain groups. In relation to individual drugs I have endeavoured, where necessary, to bring out any point of importance in their *mode of preparation*; and also to state prominently their chief *characters*. With regard to the more important drugs, I do not think that I have introduced unnecessary details; but in the case of unimportant drugs, although I have mentioned their principal characters, the student need not burden his memory with their full description, if he only knows how to recognise them.

With respect to *Pharmacy*, I have followed the same plan as in the case of the inorganic drugs, and the remarks made in relation to that class of drugs apply to those now to be considered.

GROUP I.—ENTIRE PLANT.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
1. CHIRATA— CHIRETTA. — OPHELIA CHIRATA. — N.O. GENTIANACEÆ. — The <i>entire plant</i> , collected when the fruit begins to form.	a. Stem about 3 feet long, but often in pieces; size of a goose-quill; round and smooth; pale brown; branched, the branches opposite; containing yellow pith. b. Numerous small flowers and parts of roots. c. Intensely bitter taste.	<i>Infusum Chirata.</i> Chiretta, 1 Water at 120°, 40 } Infuse half Dose.—3i to 2. } an hour, and strain. <i>Tinctura Chirata.</i> Chiretta, 1 } Macerate 48 Proof Spirit, 8 } hours, and per- colate. Dose.—℥i5 to 60. ACTION.—Pure bitter tonic.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
2. LACTUCA— LETTUCE. — LACTUCA VIROSA. — N.O. COMPOSITE.	a. Stem marked with blood-red spots. b. Leaves obtuse; arrow-shaped at the base. c. Root, top-shaped. d. Flowers, yellow. e. All parts yield a milky, foetid juice; that from the leaves in the flowering season has a strong opiate odour, a bitter taste, and an acid reaction. Exposed to the air, becomes yellow and then brown, and solidifies = <i>Lactucarium</i> .	<i>Extractum Lactuca.</i> A green extract made from the juice, by the usual method. Dose.—gr. 5 to 10. ACTION.—Sedative. Hypnotic. Laxative. Diuretic. Diaphoretic.
The <i>flowering herb of the wild plant.</i>		
3. LOBELIA. — LOBELIA INFLATA. — N.O. LOBELIACEÆ. — The <i>herb in flower, dried.</i>	a. Usually in compressed rectangular parcels, somewhat like chopped hay. b. Stem, angular. c. Capsules ovoid, inflated, ten-ribbed. d. Peculiar odour. e. Burning taste.	<i>Tinctura Lobelia.</i> Lobelia, 1 } Macerate 48 Proof Spirit, 8 } hours, and per- colate. Dose.—m 10 to 30 or more. <i>Tinctura Lobelia Ætherea.</i> Lobelia, 1 } Macerate 7 Spirit of ether, 8 } days, press, fil- ter, make up 8. Dose.—m 10 to 30. ACTION.—Diaphoretic. Expectorant. Pulmonary sedative. Antispasmodic. Emetic.
4. CETRARIA— ICELAND MOSS. — CETRARIA ISLANDICA. — N.O. LICHENES. — The <i>entire lichen.</i>	a. Foliaceous and lobed. b. Crisp and cartilaginous. c. Brownish-white; paler beneath. d. Faint, peculiar odour, when fresh; almost inodorous when dry. e. Taste bitter and mucilaginous. f. A strong decoction gelatinizes on cooling.	<i>Decoctum Cetraria.</i> Iceland moss, 3 i } Boil for 10 Water, O i } minutes after washing. Dose.—3 i to 2. ACTION.—Demulcent. Nutritious.

GROUP II.—ROOTS AND RHIZOMES.

Although botanically roots and rhizomes are not the same, rhizomes being in reality underground stems, they are conveniently grouped together in the *Materia Medica*. The official members of this group are very numerous, and in order to aid in remembering them, I have arranged them under certain subdivisions.

A. ENTIRE TAP-SHAPED ROOTS.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
1. ACONITI RADIX— ACONITE ROOT. — ACONITUM NAPELLUS. — N.O. RANUNCULACEÆ. — The root, col- lected during win- ter, and dried.	<p>a. A small root; from 1 to 3 inches long; and not thicker than the finger at the crown.</p> <p>b. Conical, rapidly tapering to a point.</p> <p>c. Numerous fibres proceed from the sides.</p> <p>d. More or less brown or blackish-brown externally; whitish internally.</p> <p>e. Earthy odour.</p> <p>f. Bitter taste at first, followed by a disagreeable tingling and numbness of the lips, tongue, &c.</p>	<p><i>Linsimentum Aconiti.</i></p> <p>Aconite root, 20 } Camphor, 1 } Moisten the Rectified spirit, 20 } root, mace- rate, and percolate.</p> <p><i>Tinctura Aconiti.</i></p> <p>Powdered root, 1 } Rectified spirit, 20 } Macerate 48 hours, and percolate.</p> <p><i>Dose.</i>—m 5 to 15.</p> <p>ACTION.—Anodyne. Vascular depressant. Spinal depressant.</p>

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
2. ARMORACIÆ RADIX— HORSE-RADISH ROOT. — COCHLEARIA ARMORACIA. — N.O. CRUCIFERÆ. — The <i>fresh</i> root, cultivated in Britain.	<p>Liabie to be mistaken for aconite, but the points of difference are sufficiently indicated in the following description:—</p> <p>a. Longer than aconite; larger; and of different shape. From $\frac{1}{4}$ to 1 inch in diameter. Slightly conical at the crown, and expanding into several short stems; then cylindrical or nearly so, and almost of the same thickness for many inches.</p> <p>b. White or yellowish tinge externally; white within.</p> <p>c. Pungent and irritating odour, especially when scraped.</p> <p>d. Bitter or sweet taste, according to circumstances, but very pungent. No tingling or numbness.</p>	<p><i>Spiritus Armoraciæ Compositus.</i> Horse-radish root, 20 Orange-peel, 20 Nutmeg, $\frac{1}{2}$ Proof spirit, 160 Water, 40 Dose.—3 i to 3.</p> <p>Mix and distil over 160°.</p> <p>ACTION.—Sialagogue. Stomachic stimulant. Diaphoretic. Diuretic.</p>
3. SCAMMONIÆ RADIX— SCAMMONY ROOT. — CONVOLVULUS SCAMMONIA. — N.O. CONVOLVULACÆ — The <i>dried</i> root.	<p>a. Large; sometimes 3 inches in diameter at the top.</p> <p>b. Tap-shaped.</p> <p>c. Brown externally; white internally.</p> <p>d. Tough and resinous.</p> <p>e. Slight odour.</p> <p>f. No taste.</p>	<p>Scammony is obtained from the <i>living</i> root, (see GUM-RESINS); and also <i>Scammony-resin</i>, (see RESINS).</p> <p>ACTION.—Drastic purgative.</p>

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
4. TARAXACI RADIX— DANDELION ROOT. — TARAXACUM DENS LEONIS. — N.O. COMPOSITÆ. — The <i>fresh root</i> , gathered between September and February, from meadows and pastures in Bri- tain.	a. Of small size. b. Tapering and branched. c. Externally <i>smooth</i> and <i>dark-brown</i> (not wrinkled and pale brown). d. Easily fractured; white internally. e. When cut or broken an inodorous milky juice escapes, which becomes brown on exposure, and deve- lopes an acid reac- tion; while mannite is also formed. f. Sweetish and bitter taste.	<i>Decoctum Taraxaci.</i> Dandelion root, 1 } Boil for 10 Water, 20 } minutes and } strain. <i>Dose.</i> — $\frac{1}{2}$ 2 to 4. <i>Extractum Taraxaci.</i> Made by pressing out the juice; heating it to 212°; straining; and evaporating by a water- bath under 160°. <i>Dose.</i> —gr. 5 to 15. <i>Succus Taraxaci.</i> Made by pressing out the juice; adding rectified spirit (1 to 3); setting aside 7 days; and filter- ing. <i>Dose.</i> — $\frac{1}{2}$ 2 to 4. ACTION.—Laxative. Cholagogue. Stomachic tonic.

B. ELONGATED PIECES—SINGLE OR BRANCHED.

1. BELLADON- NÆ RADIX— BELLADONNA ROOT. — ATROPA BELLADONNA. — N.O. ATROFACÆ. — The <i>dried root</i> , collected in early spring, or imported.	a. From 1 to 2 feet long, but usually in shorter pieces. b. $\frac{1}{4}$ to 1 inch thick. c. Branched and some- what tapering. d. Externally, brown- ish-white and wrin- kled. e. Internally, lighter in colour.	<i>Linimentum Belladonna.</i> Belladonna root, 20 } Moistened Camphor, 1 } for 3 days, Rectified spirit, 20 } and perco- } late. The source of ATROPIA. (See ALKALOIDS). ACTION.—External anodyne. The other actions of Belladonna are discussed under ATROPIA. (See ALKALOIDS).
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Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
2. GENTIANÆ RADIX— GENTIAN ROOT. — GENTIANA LUTEA. — N.O. GENTIANACEÆ. — The dried root.	<p>a. In pieces several inches long.</p> <p>b. $\frac{1}{4}$ to 1 inch thick.</p> <p>c. Cylindrical, but often twisted; may be split in two longitudinally, the edges being turned in.</p> <p>d. Externally brownish and much wrinkled longitudinally, or marked with close transverse rings.</p> <p>e. Internally yellow; spongy but tough.</p> <p>f. Peculiar sweet odour.</p> <p>g. Sweetish and then very bitter taste.</p>	<p><i>Extractum Gentiana.</i> Gentian Root, 1 Boiling Water, 10 } Infuse two hours; boil 15 minutes; press and strain; and evaporate. Dose. gr. 5 to 15.</p> <p><i>Infusum Gentiana Compositum.</i> Gentian root, gr. 60 Bitter orange-peel, gr. 60 } Infuse 1 hour Fresh lemon peel, $\frac{3}{4}$ } and strain. Boiling water, $\frac{3}{4}$ 10 Dose.—$\frac{3}{4}$ 1 to 2.</p> <p><i>Mistura Gentiana.</i> Gentian root, $\frac{3}{4}$ } Bitter orange-peel, gr. 30 } Coriander, gr. 30 } Proof spirit, $\frac{3}{4}$ 2 } Cold water, $\frac{3}{4}$ 8 } Macerate in the spirit for 2 hours; add the water; infuse for 2 hours; and strain. Dose.—$\frac{3}{4}$ $\frac{1}{2}$ to 1.</p> <p><i>Tinctura Gentiana Composita.</i> Gentian root, 1 } Bitter orange peel, $\frac{1}{4}$ } Macerate 48 hours, Cardamoms, $\frac{1}{4}$ } and per- Proof spirit, 20 } colate. Dose.—3 1 to 2.</p> <p>ACTION.—Stomachic and general tonic.</p>
3. GLYCYR- RHIZÆ RADIX— LIQUORICE ROOT. — GLYCYRRHIZA GLABRA. — N.O. LEGUMINOSÆ. — The fresh and dried rhizome.	<p>a. Long, cylindrical, branched pieces.</p> <p>b. Less than an inch in diameter.</p> <p>c. Externally greyish-brown: internally yellow.</p> <p>d. Pliable, but tough and fibrous.</p> <p>e. No odour.</p> <p>f. Sweet, mucilaginous, slightly acrid taste.</p>	<p><i>Extractum Glycyrrhizæ.</i> Made by macerating the coarsely powdered root in cold water; straining and pressing; heating to 212°; straining through flannel; and evaporating by a water-bath. Dose.—$\frac{3}{4}$ $\frac{1}{2}$ to 1. (Contained in several official preparations.)</p> <p><i>Extractum Glycyrrhizæ Liquidum.</i> Made as above, the strained liquid being evaporated to sp. gr. 1.160, $\frac{3}{4}$th of its vol. of rectified spirits added, and the whole filtered after standing 12 hours. Dose.—3 1.</p> <p><i>Pulvis Glycyrrhizæ Compositus.</i> Senna, 2 Liquorice root, 2 } Powder and Refined sugar, 6 } mix. Dose.—3 1 or more.</p> <p>ACTION.—Demulcent.</p>

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
4. KRAMERIÆ RADIX— RHATANY ROOT. — KRAMERIA TRIANDRA. — N.O. POLYGALACÆÆ. The dried rhi- some and rootlets.	<p>a. A cylindrical, woody root-stock, with numerous long rootlets or branches.</p> <p>b. Variable lengths; about an inch in diameter.</p> <p>c. Externally dark red or brownish-red, and rough.</p> <p>d. Internally reddish-yellow.</p> <p>e. Scarcely any odour.</p> <p>f. Taste sweetish and and strongly astringent, especially the bark; the inner wood is almost tasteless. Tinges the saliva red.</p>	<p><i>Extractum Krameria.</i> Made by macerating the coarsely-powdered root in cold water; percolating; and evaporating by a water-bath to dryness. <i>Dose.</i>—gr. 5 to 20.</p> <p><i>Infusum Krameria.</i> Rhatany root, 1 } Infuse 1 hour, Boiling water, 20 } and strain. <i>Dose.</i>—3 1 to 2.</p> <p><i>Tinctura Krameria.</i> Rhatany root, 1 } Macerate 48 Pr of spirit, 8 } hours, and per- colate. <i>Dose.</i>—3 1 to 2.</p> <p>ACTION.—Astringent. Tonic.</p>
5. PAREIRÆ RADIX— PAREIRA ROOT. — CISSAMPELOS PAREIRA; or CHONDODEN- DRON TOMENTOSUM. — N.O. MENISPERMACÆÆ The dried root.	<p>a. Pieces from 4 inches to 4 feet long; $\frac{1}{2}$ to 4 inches in diameter.</p> <p>b. Cylindrical, oval, or compressed. Sometimes split longitudinally.</p> <p>c. Resemble sections of a stem, presenting (i) an external bark, greyish-brown, wrinkled longitudinally; (ii) an internal woody portion, yellowish-grey, very porous or cancellated, with well-marked often incomplete concentric rings, and radiating medullary rays.</p>	<p><i>Decoctum Pareira.</i> Pareira root, 1 } Boil 15 minutes, Water, 20 } and strain. <i>Dose.</i>—3 1 to 2.</p> <p><i>Extractum Pareira.</i> Made by digestion in, and percolating with, boiling water; and evaporating by a water-bath. <i>Dose.</i>—gr. 10 to 20.</p> <p><i>Extractum Pareira Liquidum.</i> Made by macerating in, and percolating with, boiling water; evaporating; and when cold adding rectified spirit, filtering, and making up to a certain proportion. <i>Dose.</i>—3 $\frac{1}{2}$ to 2.</p> <p><i>Incompatibles.</i> — Persalts of iron; lead salts; tincture of iodine.</p> <p>ACTION.—Tonic. Diuretic.</p>

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
6. PODOPHYLLI RADIX— PODOPHYLLUM ROOT. — PODOPHYLLUM PELTATUM. — N.O. RANUNCULACEÆ. — The dried rhizome.	<p><i>a.</i> In jointed pieces of variable length, but usually short.</p> <p><i>b.</i> About the size of a quill.</p> <p><i>c.</i> Externally brown and wrinkled longitudinally, with round white spots at the joints, where the rootlets are broken off.</p> <p><i>d.</i> Short fracture, and whitish internally.</p> <p><i>e.</i> Powder is greenish-yellow; with sweet odour, and sweetish-acrid taste.</p>	<p>The source of <i>Podophylli Resina</i>, or <i>Podophyllin</i>, (see RESINS).</p> <p>ACTION.—Drastic purgative. Hepatic stimulant. Dose—gr. 10 to 20. (Podophyllin much preferable.)</p>
7. PYRETHRI RADIX— PELLITORY ROOT. — ANACYCLUS PYRETHRUM. — N.O. COMPOSITÆ. — The dried root.	<p><i>a.</i> Pieces about 2 to 3 inches long; and the size of the little finger.</p> <p><i>b.</i> Cylindrical or slightly fusiform.</p> <p><i>c.</i> Externally, thick brown bark, with shining black spots; often worm-eaten.</p> <p><i>d.</i> Internally dark-brown, with black points.</p> <p><i>e.</i> Resinous fracture; radiated structure.</p> <p><i>f.</i> When chewed causes a pricking sensation in mouth, lips, and tongue; with glowing heat; and a profuse flow of saliva.</p>	<p><i>Tinctura Pyrethri.</i> Pellitory root, 4 } Rectified spirit, 20 } Macerate 48 hours and percolate.</p> <p>ACTION.—Sialogogue.</p>

C. SHORT TRANSVERSE SECTIONS.

1. CALUMBÆ RADIX— CALUMBA ROOT. — JATEORRHIZA CALUMBA. — N.O. MENISPERMACEÆ — The root, sliced transversely and dried.	<p><i>a.</i> Circular or oval slices</p> <p><i>b.</i> $\frac{1}{2}$ to 2 or 3 inches in diameter; $\frac{1}{4}$ to $\frac{1}{2}$ inch thick.</p> <p><i>c.</i> Concavo-convex; thinner in the centre.</p> <p><i>d.</i> Externally olive or dark green.</p> <p><i>e.</i> Internally yellow; soft and often spongy; concentric.</p> <p><i>f.</i> Slightly aromatic odour.</p> <p><i>g.</i> Bitter taste.</p>	<p><i>Extractum Calumbæ.</i> Made by macerating the root in cold water; straining and pressing; filtering; and evaporating by a water-bath.</p> <p>Dose.—gr. 2 to 10.</p> <p><i>Infusum Calumbæ.</i> Calumba, 1 } Cold water, 20 } Macerate 1 hour, and strain.</p> <p>Dose.—$\frac{1}{3}$ 1 to 2.</p> <p><i>Tinctura Calumbæ.</i> Calumba, 1 } Proof spirit, 8 } Macerate 48 hours, and percolate.</p> <p>Dose.—$\frac{1}{2}$ 1 to 2.</p> <p>ACTION.—Bitter stomachic tonic.</p>
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Name. Plant. Natural Order. Nature	Description.	Pharmacy and Action.
s. SUMBUL RADIX— SUMBUL or MUSK ROOT. — EURYANGIUM SUMBUL. — N.O. UMBELLIFERÆ. The sliced and dried root.	a. Transverse sections, nearly circular. b. $\frac{2}{3}$ to 5 inches in dia- meter; $\frac{1}{2}$ to 1 inch thick. c. Externally a rough bark, light or dusky brown, wrinkled, and often beset with short bristly fibres. d. Internally porous, and presents more or less loose bundles of coarse irregular fibres. e. Musk-like odour. f. Taste sweetish, and afterwards bitterish and balsamic.	<i>Tinctura Sumbul.</i> Sumbul, 1 } Macerate 48 Proof spirit, 8 } hours, and per- colate. <i>Dose.</i> —m 15 to 30. ACTION. —Nervine and cardiac stimulant. Antispasmodic.

D. PECULIAR ROOTS.

1. IPECACU- ANHA. — CEPHEALIS IPECACUANHA. — N.O. CINCHONACEÆ or RUBIACEÆ. — <i>Annulated or Brazilian = Officinal.</i> — The dried root.	a. Pieces, 2 to 4 inches long, and about the size of small quills. b. Contorted, knotted, and irregularly an- nulated, with deep- circular fissures. c. Colour is of various shades of brown, like brownish or ash-co- loured rings on a white cord. d. Cortical or active portion=75 to 80 per cent.; slender, tough, woody centre, almost inert. e. Fractures easily, with a resinous frac- ture. f. Powder pale brown, with a faint, <i>nauseous</i> odour; and a bitter, somewhat acrid taste.	<i>Pilula Ipecacuanhæ cum Scilla.</i> Compound powder of ipecacuanha, 3 Squill, in powder, 1 Ammoniacum, in powder, 1 Treacle, q.s. <i>Dose.</i> —5 to 10 grains. <i>Pulvis Ipecacuanhæ Compositus.</i> (Dover's Powder). Ipecacuanha, 1 Opium, 1 Sulphate of potash, 8 <i>Dose.</i> —5 to 10 grains. <i>Trochisci Ipecacuanhæ</i> = $\frac{1}{2}$ gr. in each lozenge. <i>Dose.</i> —1 to 3 lozenges. <i>Trochisci Ipecacuanhæ et Morphiæ.</i> Ipecacuanha, gr. $\frac{1}{2}$ } in each Hydrochlorate of } lozenge. morphia, gr. $\frac{1}{4}$ } <i>Vinum Ipecacuanhæ.</i> Ipecacuanha, 1 } Macerate 7 days, Sherry wine, 20 } strain, and make to 20. } up with sherry <i>Dose.</i> —m 5 to 60; 33 to 36. ACTION. —Emetic. Diaphoretic. Expectorant. Vascular seda- tive. Laxative. Specific in dysentery.
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Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
2. RHEUM— RHUBARB. — UNDETERMINED SPECIES, RHEUM OFFICINALE, ETC. — N.O. — POLYGONACEÆ. — Three OFFICIAL VARIETIES. 1. Russian or Turkey. 2. East-Indian. 3. Batavian. — Several other kinds non-offi- cinal. — The root, de- prived of its bark, and dried.	1. RUSSIAN or TURKEY. a. Angular, and of various shapes, trapezoid, irregular, flat, cylindrical. b. Cortex completely removed by slicing. c. Pierced with a large hole, often reaching only to the centre. d. Externally, smooth, bright-yellow, with powder on the sur- face. e. Internally, compact; fracture uneven, ragged, and irregu- larly variegated or marbled, red and grey. 2. EAST-INDIAN or HALF TRIMMED. a. Slightly rounded. b. Has adhering por- tions of cortex. c. Externally, red and veined, and no powder. d. Denser, and presents a smoother fracture; with greenish and blackish stains. 3. BATAVIAN or DUTCH TRIMMED. a. Round or flattened. b. Angular. c. Drilled with a hole. GENERAL CHARACTERS. a. Powder—bright buff- yellow or with red- dish hue b. Peculiar, aromatic odour. c. Taste—bitter, slight- ly astringent, and aromatic; with finely gritty sensation to the teeth, due to oxa- late of lime crystals. d. Rhubarb yields its active principles to boiling water and al- cohol.	<i>Extractum Rhei.</i> Made with water and rectified spirit. <i>Dose.</i> —gr. 3 to 6. <i>Infusum Rhei.</i> Rhubarb, 1 } Infuse for 1 Boiling water, 40 } hour, and } strain. <i>Dose.</i> —3 i to 2. <i>Pilula Rhei Composita.</i> Rhubarb, 33 } Mix the Socotrine aloes, 32½ } powders Myrrh, 3 1½ } with the Hard soap, 3 1½ } oil, add Oil of peppermint, 3 1½ } the trea- Treacle, 34 } cle, and } beat into } a mass. <i>Dose.</i> —gr. 5 to 10. <i>Pulvis Rhei Compositus.</i> (Gregory's Powder). Rhubarb, 2 } Mix. Light magnesia, 6 } Ginger, 1 } <i>Dose.</i> —gr. 30 to 60; 5 to 10 for children. <i>Syrupus Rhei.</i> Rhubarb, 2 } Coriander, 2 } Percolate the Refined sugar, 24 } Rectified spirit, 8 } Water, 24 } rhubarb and coriander with the spirit and water mixed. Evaporate to 13; filter; and dissolve the sugar with gentle heat. <i>Dose.</i> —3 i to 4. <i>Tinctura Rhei.</i> Rhubarb, 2 } Prepared by Cardamom seeds, 1 } maceration Coriander, 1 } for 48 Saffron, 1 } hours, fol- Proof spirit, 20 } lowed by } percolation. <i>Dose.</i> —3 i to 3; 3 ½ to 1. <i>Vinum Rhei.</i> Rhubarb, 3 1½ } Macerate Canella bark, gr. 60 } for 7 days. Sherry wine, 3 20 } <i>Dose.</i> —3 i to 2. ACTION.—Stomachic tonic. Ape- rient. Hepatic stimulant. Astrin- gent, after the aperient action.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
3. SASSAFRAS — SASSAFRAS OFFICINALE. — N.O. LAURACEÆ. — The dried root.	a. In large branched pieces or chips. b. Wood-like in appearance. c. Bark is greyish-brown externally; rusty-brown internally. d. Wood is light, porous, greyish-yellow. e. Agreeable odour. } More f. Taste—warm, in the aromatic, and bark. (Often mistaken for <i>Quassia</i> in chips, which is lighter, odourless, and has a pure bitter taste).	No official preparation, but is contained in <i>Decoctum Sarsæ Compositum</i> . ACTION.—Vascular stimulant. Diaphoretic. Alterative. Also used as an adjuvant to other medicines, on account of flavour, &c.
4. HEMIDESMUS—INDIAN SARSAPARILLA. — HEMIDESMUS INDICUS. — N.O. ASCLEPIADACEÆ. — The dried root.	a. In pieces about the thickness of a quill; cylindrical. b. Dark yellowish-brown colour. c. Furrowed, with deep annular cracks. (Distinction from <i>Sarsaparilla</i> .) d. Fragrant odour. e. Agreeable, hot, rather bitter taste.	Syrupus Hemidesmi. Hemidesmus, 1 } Infuse 4 hours, Refined sugar, 7 } strain, and dissolve sugar by Boiling water, 5 } gentle heat. ACTION.—Diuretic. Alterative.
5. ZINGIBER—GINGER. — ZINGIBER OFFICINALE. — N.O. ZINGIBERACEÆ. — The dried and scraped rhizome.	a. Irregular, knotty, lobed pieces, somewhat compressed; 3 or 4 inches long. b. { <i>Jamaica</i> = yellowish-white; scraped. { <i>East Indian</i> = brown and wrinkled; not scraped. c. Short, mealy fracture. d. Spicy, agreeable, aromatic odour. e. Hot, and pungent taste. f. Powder—Yellowish-white.	Tinctura Zingiberis. Ginger, 1 } Macerate and Rectified spirit, 8 } percolate. Dose.—10 to 30 minims. Tinctura Zingiberis Fortior. Ginger, 10 } Percolate Rectified spirit, 20 } to 20. Dose.—5 to 20 minims. Syrupus Zingiberis. Strong Tincture of Ginger, 3 6 } Mix. Syrup, 3 19 } Dose.—3 i to 4. Ginger is an ingredient in several official preparations. ACTION.—Carminative. Stimulant. Aromatic.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
6. TURMERIC. — CURCUMA LONGA — N.O. & ZINGIBERACEÆ. — The dried rhizome.	a. Short pieces; round. b. Externally, yellow; internally, reddish- yellow. c. Peculiar, aromatic odour. d. Aromatic taste; tinges saliva yellow.	Not used medicinally, but turmeric is a condiment, and is an ordinary ingredient of "curry powder." A <i>Tincture</i> is ordered in the <i>Appendix</i> , and <i>Turmeric paper</i> is prepared from this, to test for alkalies.
7. FILIX-MAS— MALE FERN. — ASPIDIUM FILIX-MAS. — N.O. FILICES. — The dried rhizome, with the bases of the foot-stalks, and portions of the root-fibre.	a. <i>Caudex</i> or central part, short and thick, and cylindrical. b. Leaf-stalks and rootlets attached; scaly and tufted. c. Greenish-brown colour. d. Powder—greenish-brown. e. Disagreeable odour. f. Nauseous, bitter, somewhat astringent taste.	<i>Extractum Filicis Liquidum.</i> Male fern, 1 } Percolate slowly; Ether, 2½ } and then distil off the ether. <i>Dose.</i> —℥ 15 to 30. Of <i>Powder</i> , 60 to 180 grains. <i>ACTION.</i> —Anthelmintic, for tapeworm. Astringent.

E. BRANCHED GROUP.—RHIZOME WITH ROOTLETS.

1. ARNICÆ RADIX— ARNICA ROOT. — ARNICA MONTANA. — N.O. COMPOSITÆ. — The dried rhizome and rootlets.	a. Rhizome, 2 or 3 inches long; 2 or 3 lines thick. b. Cylindrical and contorted. c. Rough from the scars of leaves and adhering leaves. d. Numerous long and slender rootlets; fewer and less contorted than <i>Serpentary</i> ; more slender than <i>Veratrum Viride</i> . e. Peculiar odour; apt to excite sneezing. f. Peppery taste.	<i>Tinctura Arnica.</i> Arnica, 1 } Macerate and Rectified spirit, 20 } percolate. <i>Dose.</i> —3 x to 2. <i>ACTION.</i> —Chiefly used externally for bruises. Internally, stimulant; irritant to alimentary canal; seldom administered.
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Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
2. SENEGÆ RADIX— SENEGA ROOT. — POLYGALA SENEGA. — N.O. POLYGALACEÆ. The <i>dried root- stock and root.</i>	a. Knobby or knotted root-stock. b. Branched root, about the size of a quill, twisted and <i>keeled</i> , a line run- ning along it. c. External <i>cortex</i> (the <i>active part</i>), greyish- yellow or yellowish- brown. d. Internally, woody and inert. e. Unpleasant odour, like scammony. f. Sweetish and acrid or pungent taste, causing a flow of sa- liva.	<i>Infusum Senegæ.</i> Senega, 1 Boiling water, 20 } Infuse 1 hour, Dose.— $\frac{3}{4}$ 1 to 2. } and strain. <i>Tinctura Senegæ.</i> Senega, 1 } Macerate for 48 Proof spirit, 8 } hours, and per- Dose.— $\frac{3}{4}$ 1 to 2. } colate. ACTION. —Stimulant expectorant. Diuretic. Emetic and cathar- tic in large doses. Said to act upon the heart, rendering its action slower and more power- ful.
3. VALERIANÆ RADIX— VALERIAN ROOT. — VALERIANA OFFICINALIS. — N.O. VALERIANACEÆ. The <i>rhizome and root</i> of plants cultivated in Bri- tain, collected in autumn, and dried; wild plants growing in dry soil preferred.	a. Short rhizome, yel- lowish-white, with— b. Numerous rootlets, 2 to 3 inches long, forming a close bun- dle, fibrous. c. Characteristic, pene- trating, and disag- reeable odour. d. Nauseous, bitter, and camphoraceous taste.	<i>Infusum Valerianæ.</i> Valerian, gr. 120 Boiling water, $\frac{3}{4}$ 10 } Infuse for 1 Dose.— $\frac{3}{4}$ 1 to 2. } hour, and strain. <i>Tinctura Valerianæ.</i> Valerian, 1 } Macerate for 48 Proof spirit, 8 } hours, and per- Dose.— $\frac{3}{4}$ 1 to 2. } colate. <i>Tinctura Valerianæ Ammoniata.</i> Valerian, 1 } Macerate for 7 Aromatic spirit } days; strain, of ammonia, 8 } press, and fil- Dose.— $\frac{3}{4}$ 1 to 1. } ter; make up to 8. <i>Valerianate of Soda and Zinc</i> are official, but these are not made from <i>Valerian</i> . (See SODIUM and ZINC). ACTION. —Antispasmodic. Ner- vine stimulant.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
4. SERPENTARIA RADIX— SERPENTARY ROOT. — ARISTOLOCHIA SERPENTARIA. — N.O. ARISTOLOCHIÆ. — The dried rhizome and rootlets.	a. Small, roundish rhizome. b. Yellowish; no adhering leaves or scars. (Distinction from <i>Arnica</i>). c. Very numerous, slender rootlets, forming a tuft, about 3 inches long. d. Aromatic and camphoraceous odour. e. Warm, bitter, and camphoraceous taste.	<i>Infusum Serpentariae.</i> Serpentary, 1 } Infuse 2 hours Boiling water, 40 } and strain. <i>Dose.</i> — $\frac{1}{2}$ i to 2. <i>Tinctura Serpentariae.</i> Serpentary, 1 } Macerate for 48 Proof spirit, 8 } hours, and percolate. <i>Dose.</i> — $\frac{1}{2}$ i to 2. ACTION.—Stimulant. Stomachic tonic. Diaphoretic. Alterative.
5. SARSÆ RADIX— SARSAPARILLA ROOT. — SMILAX OFFICINALIS. — N.O. SMILACÆ. — Several varieties, but <i>Jamaica Sarsaparilla</i> is the only official one. — The dried root.	a. Rhizome or "clump," covered with rootlets, and spirally twisted, = "bearded." b. Usually many feet long: folded in bundles 1 to 1½ foot long. c. About the size of a goose-quill. d. Reddish-brown; not cracked transversely. (Distinction from <i>Hemidesmus</i>). e. No odour. Taste—mucilaginous, feebly bitter and acrid. f. Root distinguishable into (i) cortex, (ii) medullium, (iii) pith.	<i>Decoctum Sarsæ.</i> Sarsaparilla, 1 } Digest 1 hour; Boiling water, 8 } boil 10 minutes; cool; strain; and make up to 8. <i>Dose.</i> — $\frac{1}{2}$ to 20 daily. <i>Decoctum Sarsæ Compositum.</i> Sarsaparilla, $\frac{3}{4}$ 2½ } Sassafras, $\frac{3}{4}$ 2½ } As above; Guaiacum wood, $\frac{3}{4}$ 2½ } make up Liquorice root, $\frac{3}{4}$ 2½ } to $\frac{3}{4}$ 20. Mezereon, gr. 60 } Boiling water, $\frac{3}{4}$ 30 } <i>Dose.</i> — $\frac{1}{2}$ i to 20 daily. <i>Extractum Sarsæ Liquidum</i> An alcoholic extract made with rectified spirit and water. <i>Dose.</i> — $\frac{1}{2}$ i to 4. ACTION.—Alterative. Tonic.
6. VERATRI VIRIDIS RADIX— GREEN HELLEBORE ROOT. — VERATRUM VIRIDE. — N.O. MELANTHACÆ. — The dried rhizome and rootlets.	a. Rhizome—thick, fleshy, conical and truncated. b. Externally earthy black; light-coloured within. c. Numerous pale-yellow rootlets; comparatively thick; marked with indentations. d. Often cut into quarters, or slices; or in compressed cakes. e. Peculiar bitter and acrid taste; with a sensation of numbness and tingling of the tongue and fauces.	<i>Tinctura Veratri Viridis.</i> Green Hellebore, 4 } Macerate 48 Rectified spirit, 20 } hours, and percolate. <i>Dose.</i> —m 5 to 20. ACTION.—Emetic. Vascular and nervous depressant. Increases most secretions. Irritant to alimentary canal

F. BARK OF ROOT.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
1. GRANATI RADICIS CORTEX— POMEGRANA- TE ROOT BARK. — PUNICA GRANATUM. — N.O. MYRTACEÆ. — The bark of the root, fresh or dried.	<p>a. In quills or frag- ments; thin.</p> <p>b. Externally, greyish- yellow.</p> <p>c. Internally, yellow, and will produce a yellow stain when moistened, and rubbed on paper.</p> <p>d. Short fracture.</p> <p>e. Slight odour; as- tringent and slightly bitter taste.</p>	<p><i>Decoctum Granati Radicis.</i></p> <p>Pomegranate root bark, 1 } Boil to Water, 20 } 10, and strain.</p> <p><i>Dose.</i>—$\frac{1}{3}$ 1 to 2.</p> <p><i>Incompatibles.</i>—Alkalies, lime- water, metallic salts, gelatine.</p> <p><i>ACTION.</i>—Astringent. Anthel- mintic.</p>

GROUP III.—BARKS.

In the following list, only the *true barks* are considered, namely, those which form the outer covering of the stem.

1. CANELLÆ ALBÆ CORTEX— CANELLA BARK. — CANELLA ALBA. — N.O. CANELLACEÆ. — The dried bark.	<p>a. Quills or broken flattened pieces.</p> <p>b. Various lengths; about an inch in di- ameter.</p> <p>c. <i>Light-coloured.</i> Pink- ish-white externally; lighter internally.</p> <p>d. Hard, breaks with a starchy or granular fracture.</p> <p>e. Aromatic, spicy, clove-like odour.</p> <p>f. Taste, warm, pep- pery, acrid, and bit- ter.</p>	<p>No official preparations. Con- tained in <i>Vinum Rhei</i>.</p> <p><i>ACTION.</i>—Bitter and aromatic. Generally used merely for fla- vouring; or as an aromatic with purgatives.</p> <p><i>Dose.</i>—Of powdered bark, gr. 10 to 30.</p>
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Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
2. CUSPARIÆ CORTEX— CUSPARIA or ANGUSTURA BARK. — GALIPEA CUSPARIA. — N.O. RUTACEÆ. <i>The dried bark.</i>	<p>a. Straight pieces, generally incurved at the sides; or in quills.</p> <p>b. Pared or "feathered" at the edges.</p> <p>c. Several inches long; very thin, $\frac{1}{8}$ to 1 line.</p> <p>d. Externally, uneven epidermis, mottled, brownish or yellowish-grey.</p> <p>e. Internally, light-brown or yellowish-brown; flaky; separable into layers.</p> <p>f. Fracture short and resinous.</p> <p>g. Cut surface exhibits to the lens numerous white points or minute lines=raphides of oxalate of lime, and liber-fibres.</p> <p>h. Peculiar odour; very bitter and aromatic taste.</p> <p>ADULTERATION. False angustura bark—the bark of <i>Strychnos Nux Vomica</i>. Inner surface becomes blood-red with nitric acid.</p>	<p><i>Infusum Cuspariæ.</i> Cusparia, 1 } Infuse 2 hours, Water at 120°, 20 } and strain. Dose.—$\frac{1}{2}$ 1 to 2.</p> <p><i>Incompatibles.</i> — Mineral acids; perchloride of iron; metallic salts.</p> <p><i>ACTION.</i> — Aromatic and bitter stomachic tonic. Antiperiodic (?).</p> <p>Dose of powdered bark, gr. 10-20</p>
3. CASCARILLÆ CORTEX— CASCARILLA BARK. — CROTON ELUTERIA. — N.O. EUPHORBIACEÆ. <i>The dried bark.</i>	<p>a. Usually in quills; sometimes flattened pieces.</p> <p>b. Short and small pieces, 2 to 4 inches in length; 2 to 5 lines in diameter.</p> <p>c. Externally, dull-brown, but usually presents white spots, or is more or less coated with lichens; fissured in both directions.</p> <p>d. Fracture short and resinous.</p> <p>e. Odour—fragrant and spicy, especially when burned.</p> <p>f. Taste—bitter and aromatic.</p>	<p><i>Infusum Cascarillæ.</i> Cascarilla, 1 } Infuse an hour, Boiling water, 10 } and strain. Dose.—$\frac{1}{2}$ 1 to 2.</p> <p><i>Tinctura Cascarillæ.</i> Cascarilla, 1 } Macerate 48 hours, Proof spirit, 8 } and percolate. Dose.—$\frac{1}{2}$ 1 to 2.</p> <p><i>Incompatibles.</i> — Lime-water; metallic salts; mineral acids.</p> <p><i>ACTION.</i> — Aromatic and bitter stomachic tonic. Antiperiodic. Stimulant expectorant.</p>

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
6. LARICIS CORTEX— LARCH BARK. — LARIX EUROPEA. — N.O. CONIFERÆ. — The bark, deprived of its outer layer.	a. In flat pieces usually; sometimes in quills. b. 3 to 6 inches long; 2 to 4 inches wide. c. Externally, when de- prived of epidermis =reddish. (If epi- dermis is attached, is greyish, and spot- ted with lichens; irregularly fissured; beaded with resinous exudation). d. Internally, yellowish or red, and fibrous. e. Faint terebinthinate odour.	<i>Tinctura Laricis.</i> Larch bark, 1 Rectified spirit, 8 } Macerate 48 hours, and percolate. <i>Dose.</i> —℥ 20 to 25. <i>ACTION.</i> —Astringent. Stimulant expectorant.
7. MEZEREI CORTEX— MEZEREON BARK. — DAPHNE MEZEREUM and LAUREOLA. — N.O. THYMELACÆ. — The dried bark.	a. Strips or quilled pieces; curled or flat. b. Various lengths; thin. c. Externally brown; internally white. d. Tough and fibrous. e. Odour faint and nauseous. f. Taste—hot and very acid.	<i>Extractum Mezerei Æthereum.</i> Made with rectified spirit and ether. An ingredient in <i>Lini- mentum Sinapis Compositum.</i> Mezereum is an ingredient in <i>Decoctum Sarsæ Compositum.</i> <i>ACTION.</i> —Rubefacient and vesi- cant. Stimulant. Diuretic. Diaphoretic. Alterative.
8. NECTAN- DRÆ CORTEX —BEBEERU BARK. — NECTANDRA RODLEI. — N.O. LAURACÆ. — The dried bark.	a. In flat pieces. b. 1 to 2 feet long; 2 to 6 inches wide; $\frac{1}{2}$ inch thick. c. Very heavy and hard; fibrous. d. Externally, greyish- brown; internally, dark cinnamon- brown. e. Taste—strongly and persistently bitter, and astringent.	<i>Beberia Sulphas.</i> —This salt is obtained from Nectandra Bark. (See ALKALOIDS). <i>ACTION.</i> —Tonic. Antiperiodic.
9. QUERCUS CORTEX— OAK-BARK. — QUERCUS PEDUNCULATA. — N.O. CUPULIFERÆ.	a. Long pieces; thin. b. Externally, a grey- ish-white and shining epidermis. c. Internally, cinna- mon-brown. d. Brittle and fibrous. e. Strongly astringent taste.	<i>Decoctum Quercus.</i> Oak-bark, $1\frac{1}{2}$ } Boil 10 minutes, Water, 20 } strain, and make up 20. <i>Dose.</i> — $\frac{3}{4}$ 1 to 2. <i>Incompatibles.</i> —Mineral acids, alkalies, metallic salts, gela- tine, and alkaloids. <i>ACTION.</i> —Astringent.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
<p>10. ULMI CORTEX— ELM-BARK. — ULMUS CAMPESTRIS. — N.O. ULMACEÆ. — The inner bark.</p>	<p>a. Flat pieces; broad; $\frac{1}{2}$ line thick. b. Lightish brown or brownish-yellow; no epidermis. c. Tough and fibrous. d. No smell; taste—mucilaginous, slightly bitter and astringent.</p>	<p><i>Decoctum Ulmi.</i> Elm-bark, 1 } Boil 10 minutes, Water, 8 } strain, and make up to 8. <i>Dose.</i>—$\frac{3}{4}$ 2 to 4. <i>Incompatibles.</i>—Sulphate of iron; acetate of lead; nitrate of silver; gelatine. <i>ACTION.</i>—Demulcent. Slightly astringent.</p>

GROUP IV.—WOODS OR STEMS.

<p>1. GUAIACI LIGNUM— GUAIAECUM WOOD. — GUAIAECUM OFFICINALE. (LIGNUM VITÆ). — N.O. ZYGOPHYLLACEÆ — In logs, and coarse powder or chips.</p>	<p>a. Logs are of some size. b. Usually no bark. c. Section—<i>alburnum</i>, pale-yellow; <i>duramen</i> or <i>heart-wood</i>, dark greenish-brown. Striking "cross-grained" appearance, the fibres intersecting diagonally and obliquely. d. Very heavy, tough, and hard. Sp. gr. 1.33. Sinks readily in water. e. Nitric acid applied to the dark or central wood produces a bluish-green colour. f. Usually seen in coarse powder or chips, the wood being reduced by a turning lathe.</p>	<p>No official preparations, but is the source of <i>Guaiacum resin</i>. (See RESINS). Contained in <i>Decoctum Sarsæ Compositum</i>. <i>ACTION.</i>—Stimulant diaphoretic. Alterative.</p>
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Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
2. HÆMATOXYLI LIGNUM— LOGWOOD. — HÆMATOXYLON CAMPECHIANUM. — N.O. LEGUMINOSÆ. — In logs and chips.	1. Logs. a. Consist only of heart-wood. b. Heavy; sinks in water. c. Externally dark red; internally reddish-brown. 2. Chips. a. Red, with green or greenish-yellow lustre, due to crystalline hæmatoxylin. b. Feeble odour, like violets. c. Sweetish astringent taste; colours saliva. d. Colouring and astringent principles soluble in water and alcohol.	<i>Decoctum Hæmatoxyli.</i> Logwood chips, ʒ i } Boil 10 minutes; strain; Cinnamon, gr. 60 } and make up Water, ʒ 20 } to 20. <i>Dose.</i> —ʒ i to 2. <i>Extractum Hæmatoxyli.</i> Made by infusing for 24 hours in boiling water; boiling; straining; and evaporating. <i>Dose.</i> —gr. 10 to 30. <i>Incompatibles.</i> —Mineral acids; metallic salts; lime-water; tartar emetic. <i>ACTION.</i> —Astringent.
3. PTEROCARPI LIGNUM— RED SANDAL- WOOD. — PTEROCARPUS SANTALINUS. — N.O. LEGUMINOSÆ. — In logs and chips or raspings.	1. Logs. a. Externally dark-brown. Transverse section variegated with dark and light rays. b. Dense and heavy. 2. Chips. a. Dark-red colour; no lustre. b. Faint, peculiar, violet-like odour. c. Taste slightly astringent. d. Powder has a blood-red colour. e. Colouring matter not soluble in water.	No official preparations. Contained in <i>Tinctura Lavandula Composita</i> . <i>ACTION.</i> —Only used as a colouring agent. Somewhat astringent.
4. QUASSIÆ LIGNUM— QUASSIA WOOD. — PICRÆNA EXCELSA. — N.O. SIMARUBACÆ. — In logs and chips.	1. Logs. a. Various sizes; may be very large. b. Externally greyish-brown, and not unfrequently has an efflorescence of nitrate of potash on its surface. c. Internally whitish, becoming yellow on exposure. d. Very tough; less dense than other woods.	<i>Extractum Quassia.</i> Made with cold water, by maceration, percolation, and evaporation. <i>Dose.</i> —gr. 3 to 5. <i>Infusum Quassia.</i> Quassia, gr. 60 } Infuse ½ an hour, Cold water, ʒ 10 } and strain. <i>Dose.</i> —ʒ i to 2.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
QUASSIA (continued).	2. <i>Chips.</i> a. Whitish or pale yellow. } Thus distin- b. Odourless. } guished c. Pure and intense bit- } from ter taste. } <i>Sassafras.</i>	<i>Tinctura Quassia.</i> Quassia, 4 } Digest 7 days ; Proof spirit, 20 } filter ; make up to 20. <i>Dose.</i> —3 i to 2 ACTION. —Pure bitter tonic and stomachic. Antiperiodic (?) An- thelmintic for thread-worms. <i>May be given with iron.</i>

GROUP V.—GREEN TOPS AND TWIGS.

1. SCOPARIÆ CACUMINA— BROOM-TOPS. — SAROTHAMNUS SCOPARIUS. — N.O. LEGUMINOSÆ. — The tops, fresh and dried.	a. Straight, <i>pentangu-</i> lar twigs. b. Smooth; dark- green; tough. c. Small oblong leaves. d. Peculiar odour when bruised ; lost in the process of drying. e. Bitter nauseous taste.	<i>Decoctum Scoparii.</i> Dried broom tops, 1 } Boil 10 min- Water, 20 } utes, and strain. <i>Dose.</i> —3 2 to 4. <i>Succus Scoparii.</i> —Made by ex- pressing the juice from fresh- broom-tops; adding rectified spirit (1 to 3); setting aside 7 days; and filtering. <i>Dose.</i> —3 i to 2. ACTION. —Diuretic. Cathartic in large doses.
2. SABINÆ CACUMINA— SAVIN-TOPS. — JUNIPERUS SABINA. — N.O. CONIFERÆ. — The tops, fresh and dried.	a. Twigs densely covered with minute imbricated leaves in four rows. b. Dark-green colour. c. Strong, peculiar, un- pleasant odour. d. Disagreeable taste, acid and bitter.	<i>Oleum Sabinæ.</i> (See OILS). <i>Tinctura Sabinæ.</i> Savin-tops, 1 } Macerate 48 Proof spirit, 8 } hours; perco- late; and make up to 20. <i>Dose.</i> —m 15 to 30. <i>Unguentum Sabinæ.</i> Fresh savin-tops, 8 } Melt, add Yellow wax, 3 } the savin, Prepared lard, 16 } and digest 20 minutes ; strain, and press. ACTION. —Local stimulant and irritant. Internal stimulant. Emmenagogue. Ecbolic. An- thelmintic. Diaphoretic.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
3. DULCAMARA— BITTER-SWEET. — SOLANUM DULCAMARA. — N.O. SOLANACEÆ. — <i>The dried young branches, which have shed their leaves.</i>	<i>a.</i> In pieces 1 to 2 inches long. <i>b.</i> Cylindrical: about the size of a goose-quill. <i>c.</i> Light and hollow. <i>d.</i> Brown externally; pale internally. <i>e.</i> No odour. <i>f.</i> Bitter and then sweetish taste.	<i>Infusum Dulcamaræ.</i> Dulcamara, 1 Boiling water, 10 } Infuse 1 hour, and strain. <i>Dose.</i> — $\frac{1}{3}$ 1 to 2. <hr/> ACTION.—Diuretic. Diaphoretic. Alterative.

GROUP VI.—LEAVES.

The leaves in the B.P. are numerous, and it will be convenient to subdivide them into certain classes. In some cases small branches or flowers are used along with the leaves, but these may also be considered in this connection.

A. LARGE LEAVES.

1. ACONITI FOLIA— ACONITE LEAVES. — ACONITUM NAPELLUS. — N.O. RANUNCULACEÆ. — <i>The fresh leaves and flowering tops, gathered when the flowers are about one- third expanded.</i>	<i>1. Leaves.</i> <i>a.</i> Palmate; 5-partite; with five deeply-cut, wedge-shaped segments. <i>b.</i> Dark-green above; light beneath. <i>c.</i> Smooth on the surface. <i>d.</i> Produce a sensation of tingling and numbness when chewed. <i>2. Flowers.</i> <i>a.</i> In dense racemes. <i>b.</i> Deep-blue or purple colour. <i>c.</i> Helmet-shaped, petaloid calyx.	<i>Extractum Aconiti.</i> One of the green extracts, made out of the juice pressed from the fresh leaves and flowering-tops, by the usual process. (See EXTRACTS). <i>Dose.</i> —gr. 1 to 2. <hr/> ACTION.—External and internal anodyne. Vascular depressant. Spinal sedative and depressant. (See ACONITE ROOT and ACONITIA).
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Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
2. BELLA- DONNÆ FOLIA— BELLADONNA LEAVES. — ATROPA BELLADONNA. — N.O. ATROFACEÆ.	<p>a. From 3 to 6 inches long.</p> <p>b. Ovate and acute; entire.</p> <p>c. Alternate; uppermost in pairs, and unequal.</p> <p>d. Dark-green colour.</p> <p>e. Smooth and soft.</p> <p>f. Give out a foetid odour when bruised.</p>	<p><i>Emplastrum Belladonna</i> Extract of bella- donna, 3 } Make an alco- Resin plaster, 3 } holic extract; Rectified spirit, 6 } and mix with the melted resin plaster.</p> <p><i>Extractum Belladonna.</i> A green extract, made out of the juice in the usual way. (See EXTRACTS). Dose.—gr. $\frac{1}{2}$ to $\frac{1}{4}$, gradually in- creased.</p> <p><i>Succus Belladonna.</i> Freshly expressed juice, 3 } Mix; filter Rectified spirit, 1 } in 7 days. Dose.—m 5 to 15.</p> <p><i>Tinctura Belladonna.</i> Dried leaves, 1 } Macerate 48 Proof spirit, 20 } hours, and per- colate.</p> <p><i>Unguentum Belladonna.</i> Extract of belladonna, gr. 80. Lard, $\frac{3}{4}$ 1.</p> <p>ACTION.—Similar to ATROPIA. (See ALKALOIDS).</p>
3. DIGITALIS FOLIA— DIGITALIS LEAVES. — DIGITALIS PURPUREA. — N.O. SCROPHULARIA- CÆÆ. — The dried leaves.	<p>a. Short petiole; sub- sessile.</p> <p>b. Ovate-lanceolate, or oblong.</p> <p>c. Crenate at the edges.</p> <p>d. Dull-green; pale on the under surface.</p> <p>e. Rugose; downy, es- pecially on the un- der surface, which is much veined.</p> <p>f. Peculiar odour, but not strong.</p> <p>g. Taste—bitter, nau- seous, and acrid. (Liable to change with keeping, and to lose their properties; should be kept from air and light, and renewed annually.</p>	<p><i>Infusum Digitalis.</i> Digitalis, gr. 30 } Infuse 1 hour, Boiling water, $\frac{3}{4}$ 10 } and strain. Dose.—$\frac{3}{4}$ 1 to $\frac{3}{4}$ 2.</p> <p><i>Tinctura Digitalis.</i> Digitalis, 1 } Macerate 48 Proof spirit, 8 } hours, and perco- late. Dose.—m 10 to 30 or more.</p> <p><i>Incompatibles.</i>—Sulphate and tincture of iron; acetate of lead; preparations of cinchona.</p> <p>ACTION.—Cardiac sedative and tonic. Acts on vessels, causing contraction of arterioles and increased arterial tension, fol- lowed by relaxation and dilata- tion. Diuretic. Indirect cere- bral sedative Ecbohc.</p>

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
4. HYOSCYAMI FOLIA— HYOSCYAMUS LEAVES. — HYOSCYAMUS NIGER. — N.O. ATROPACEÆ. — <i>a. The fresh leaves and small bran- ches.</i> <i>b. The leaves care- fully dried.</i>	<i>a. The leaves are of considerable size ; sessile.</i> <i>b. Oblong ; acutely and unequally sinuate.</i> <i>c. Dull-green colour.</i> <i>d. Woolly or hairy ; clammy and when fresh viscid.</i> <i>e. Strong, unpleasant odour.</i> <i>f. Slightly acrid taste, which nearly disap- pears on drying.</i>	<i>Extractum Hyoscyami.</i> <i>A green extract, prepared from the fresh juice in the usual way.</i> <i>Dose.—gr. 3 to 6.</i> <i>Succus Hyoscyami.</i> <i>Fresh juice, 3 } Mix ; filter in</i> <i>Rectified spirit, 1 } 7 days.</i> <i>Dose.—3 ½ to 1.</i> <i>Tinctura Hyoscyami.</i> <i>Dried leaves, 1 } Macerate 48</i> <i>Proof spirit, 8 } hours, and per- colate.</i> <i>Dose.—m 15 to 60 or more.</i> <i>Incompatibles.</i> —Liquor potassæ and sodæ ; acetate of lead ; vegetable acids. <i>Action.</i> —External anodyne. My- driatic. Sedative. Narcotic. Aid to purgatives.
5. LAURO- CÉRASIFOLIA —CHERRY- LAUREL LEAVES. — PRUNUS LAUROCERASUS. — N.O. ROSACEÆ. — <i>The fresh leaves</i>	<i>a. 4 to 5 inches long ; about 2 inches broad.</i> <i>b. Strong, short petiole ; glands at the base.</i> <i>c. Ovate-lanceolate or elliptical ; toothed.</i> <i>d. Deep-green on the upper surface ; lighter and dull on the lower surface.</i> <i>e. Smooth and shining ; coriaceous texture.</i> <i>f. Ratafia-like odour when bruised.</i>	<i>Aqua Laurocerasi.</i> <i>Cherry-laurel leaves, 16 } Mace- Water, 50. } rate, and (Contains Hydrocyanic Acid). Dose.—m 5 to 30.</i> <i>Action.</i> —Sedative.
6. MATICÆ FOLIA— MATICO LEAVES. — ARTANTHE ELONGATA. — N.O. PIPERACEÆ. <i>The dried leaves.</i>	<i>a. From 2 to 8 inches long ; pointed.</i> <i>b. Much veined and tessellated above ; downy beneath.</i> <i>c. Agreeable aromatic odour.</i> <i>d. Aromatic, warm, and slightly astrin- gent taste.</i>	<i>Infusum Maticæ.</i> <i>Matico, 1 } Infuse ½ an</i> <i>Boiling water, 50 } hour, and</i> <i>Dose.—3 1 to 4. } strain.</i> <i>Action.</i> —External styptic. Aro- matic tonic and stimulant.
7. STRAMONII FOLIA— STRAMONIUM LEAVES. — DATURA STRAMONIUM. — N.O. ATROPACEÆ. <i>The dried leaves.</i>	<i>a. Large leaves.</i> <i>b. Ovate ; unequally sinuous ; deeply cut or toothed.</i> <i>c. Dark-green ; smooth.</i> <i>d. Rank heavy odour, es- pecially while drying.</i> <i>e. Mawkish, faintly bit- ter, nauseous taste.</i>	<i>No official preparations.</i> <i>Dose of powdered leaves, gr. 1 or more.</i> <i>Action.</i> —Smoked as an anti- spasmodic or pulmonary seda- tive in asthma.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
8. TABACI FOLIA— TOBACCO. — NICOTIANA TABACUM. — N.O. ATROPACEÆ. — The dried leaves.	<p>a. Of large size.</p> <p>b. Ovate or oblong-lanceolate; acuminate.</p> <p>c. Pale-green when fresh; mottled-brown when dry.</p> <p>d. Present numerous short glandular hairs.</p> <p>e. Characteristic, heavy, narcotic odour, when dried.</p> <p>f. Nauseous, bitter, and acrid taste.</p>	<p><i>Enema Tabaci.</i></p> <p>Tobacco, gr. 20 } Infuse $\frac{1}{2}$ Boiling water, 38 } an hour, and strain.</p> <p>ACTION. — Vascular sedative and depressant. Narcotic. Emetic. Pulmonary sedative and expectorant when smoked.</p>

B. SMALL LEAVES.

1. BUCHU FOLIA— BUCHU LEAVES. — BAROSMA. — VARIETIES:— a. <i>Betulina</i> . b. <i>Crenulata</i> . c. <i>Serratifolia</i> . — N.O. RUTACEÆ. — The dried leaves.	<p>a. Length { <i>Betulina</i>— Short=$\frac{3}{4}$ in. <i>Crenulata</i>— Medium=1 in. <i>Serratifolia</i>— Long=1 to 1$\frac{1}{2}$ in.</p> <p>b. Shape { <i>Betulina</i>— Obovate, with recurved and truncated apex. <i>Crenulata</i>— Oval-lanceolate, or obtuse. <i>Serratifolia</i>. Linear-lanceolate, and tapering at each end.</p> <p>c. Margins { <i>Betulina</i>— Sharp, cartilaginous, spreading teeth <i>Crenulata</i>— Minutely crenulated. <i>Serratifolia</i>— Sharply and finely serrated.</p> <p>Common properties:— d. Smooth; coriaceous texture. e. Light yellowish or greyish-green colour. f. Oil-glands = pellucid dots, especially in the indentations, and at the apex. g. Powerful, peculiar odour. h. Warm, camphoraceous taste.</p>	<p><i>Infusum Buchu.</i></p> <p>Buchu, 1 } Infuse Boiling water, 20 } 1 hour, and strain.</p> <p>Dose.—3x to 4.</p> <p><i>Tinctura Buchu.</i></p> <p>Buchu, 1 } Macerate Proof spirit, 8 } 48 hours, and percolate.</p> <p>Dose.—3x to 4.</p> <p>ACTION. — Diuretic. Has special action on urinary mucous membrane. Diaphoretic. Stomachic tonic.</p>
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Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
3. UVÆ URSI FOLIA— BEARBERRY LEAVES. — ARCTOSTAPHYLOS UVA URSI. — N.O. ERICACEÆ. The dried leaves.	<p>a. About $\frac{1}{2}$ inch long.</p> <p>b. Obovate; obtuse; <i>entire</i>.</p> <p>c. Dark-green colour.</p> <p>d. Shining above; reticulated beneath; <i>not dotted</i>; coriaceous.</p> <p>e. Feeble hay-like or tea-like odour, especially when powdered.</p> <p>f. Strongly <i>astringent</i> taste.</p>	<p><i>Infusum Uvæ Ursi.</i> Uva ursi leaves, 1 } Infuse 2 hours, Boiling water, 20 } and strain. <i>Dose.</i>—$\frac{1}{2}$ i to 2.</p> <hr/> <p><i>Incompatibles.</i>—Iron and lead salts; nitrate of silver; vegetable alkaloids; gelatine.</p> <hr/> <p><i>ACTION.</i>—Astringent, acting especially on urinary organs. Tonic.</p>

C. PECULIAR—MUCH-DIVIDED LEAVES.

<p>1. CONII FOLIA— HEMLOCK LEAVES. — CONIUM MACULATUM. — N.O. UMBELLIFERÆ. a. The fresh leaves with the young branches. b. The leaves, carefully dried.</p>	<p>a. Decomound = tri-pinnate, with pinnatifid leaflets.</p> <p>b. Stem <i>smooth</i>; with <i>dark purple</i> spots; <i>not swollen</i> at the nodes; petiole furrowed and sheathing at the base.</p> <p>c. Deep-green; smooth and shining.</p> <p>d. Characteristic, disagreeable odour when bruised, due to <i>volatile oil</i>.</p> <p>(<i>Conia</i> has also a peculiar odour, which is brought out strongly by rubbing the leaves with solution of potash).</p>	<p><i>Cataplasma Conii.</i> Made with conium leaves, linseed-meal, and boiling water.</p> <hr/> <p><i>Extractum Conii.</i> A <i>green extract</i> made from the <i>fresh juice</i>, in the usual way. <i>Dose.</i>—gr. 2 to 8.</p> <hr/> <p><i>Pilula Conii Composita.</i> Extract of conium, 5 } Ipecacuanha, 1 } <i>Mix.</i> Treacle, q.s. <i>Dose.</i>—gr. 5 to 10.</p> <hr/> <p><i>Succus Conii.</i> Fresh juice, 3 } <i>Mix, and filter</i> Rectified spirit, 1 } <i>in 7 days.</i> <i>Dose.</i>—$\frac{3}{4}$ to 1 or more.</p> <hr/> <p><i>Vapor Conia.</i></p> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> <p>Extract of conium, gr. 60 Solution of potash, 3 i Water, 3 i</p> </div> <div style="font-size: 3em; line-height: 1;">}</div> <div> <p><i>Mix and put 20 minims on a sponge in a suitable steam inhaler.</i></p> </div> </div> <hr/> <p><i>ACTION.</i>—External anodyne. Internal anodyne. Antispasmodic. Spinal sedative, and paralyses the ends of the motor nerves. Pulmonary sedative, especially when inhaled.</p>
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GROUP VII.—FLOWERING-TOPS.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
<p>1. CANNABIS INDICA— INDIAN HEMP.</p> <p>— CANNABIS SATIVA.</p> <p>— N.O. CANNABINACEÆ.</p> <p>— The <i>dried flower- ing tops</i> of the <i>female plant</i>, from which the resin has not been removed; cultivated in India.</p>	<p>a. In pressed masses, about 2 inches long, consisting of the branches, with the remains of flowers and smaller leaves, and a few ripe fruits.</p> <p>b. Dark or dusky green colour.</p> <p>c. Characteristic odour.</p>	<p><i>Extractum Cannabis Indicæ.</i> An <i>alcoholic</i> extract, made with <i>rectified spirit</i>. <i>Dose.</i>—gr. $\frac{1}{2}$ to 1 or more.</p> <p>— <i>Tinctura Cannabis Indicæ.</i> Extract of Indian hemp, 1 } Dis- Rectified spirit, 20 } solve. <i>Dose.</i>—m 5 to 20.</p> <p>ACTION. — Cerebral excitant. Anodyne. Soporific and narcotic. Antispasmodic.</p>
<p>2. CUSSO— KOUSSO.</p> <p>— BRAYERA ANTHELMINTICA.</p> <p>— N.O. ROSACEÆ.</p> <p>— The <i>flowers and tops</i>.</p>	<p>a. In bundles, consisting of the twigs, male and female flowers, and unripe fruits.</p> <p>b. General colour is yellowish-green, but small reddish-brown flowers are visible on hairy stalks, with purple edges of the petals streaking the general colour.</p> <p>c. Peculiar odour, something like tea; fragrant and balsamic.</p> <p>d. Disagreeable, somewhat acrid taste</p>	<p><i>Infusum Cusso.</i></p> <p>Koussou, $\frac{1}{2}$ { Infuse for $\frac{1}{2}$ of Boiling water, $\frac{3}{4}$ { an hour, and take <i>without</i> <i>straining</i>.</p> <p>ACTION.—Anthelmintic, for tape-worm.</p>

GROUP VIII.—FLOWERS AND BUDS.

A. FLOWER-BUDS.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
1. CARYO- PHYLLUM— CLOVES. — CARYOPHYLLUS AROMATICUS. — N.O. MYRTACEÆ. — The dried unex- panded flower- buds.	a. Nail-like in shape. A nearly cylindrical body, with 4 teeth, and a globular head, which is the unexpanded corolla. b. About $\frac{1}{2}$ an inch long. c. Dark reddish-brown colour. d. Strong fragrant, characteristic odour, especially when indented with the nail. e. Pungent, spicy, and bitter taste.	<i>Infusum Caryophylli.</i> Cloves, 1 } Infuse $\frac{1}{2}$ an Boiling water, 40 } hour, and Dose.— $\frac{3}{4}$ 1 to 2. } strain. <i>Oleum Caryophylli.</i> (See OILS). Powdered } <i>Infusum Aurantii</i> cloves con- } Compositum. tained in } <i>Mistura Ferri Aro-</i> } <i>matica.</i> } <i>Vinum Opii.</i> <i>Incompatibles.</i> —Mineral acids, lime-water; salts of iron; gelatine. ACTION.—Carminative. Aro- matic. Stimulant.
2. SANTONICA —WORM- SEEDS. — ARTEMISIA SANTONICA. — N.O. COMPOSITÆ. — Unexpanded flower heads.	a. Minute bodies; over a line long; about $\frac{1}{4}$ a line broad. b. Seed-like; fusiform; blunt at the ends. c. Consist of imbricated involucre scales, with a green midrib, enclosing 4 or 5 tubular flowers. d. Strong odour. e. Bitter and camphoraceous taste.	No official preparation. Santonica is the source of <i>Santonin</i> . (See SANTONIN). Dose.—gr. 10 to 60. ACTION.—Anthelmintic, for round worm.

B. ENTIRE FLOWERS.

1. ANTHEMIDIS FLORES— CHAMOMILE. — ANTHEMIS NOBILIS. — N.O. COMPOSITÆ. — The dried flowers.	a. Flower-heads like a daisy, consisting of florets on a conical scaly receptacle. b. Florets are yellow tubular, and white strap-shaped; or only white. c. Characteristic strong, and pleasant odour. d. Taste, aromatic and bitter.	<i>Extractum Anthemidis.</i> Made by boiling chamomile in water; straining, pressing, and filtering; evaporating to a pill-consistence; and adding oil of chamomile. Dose.—gr. 2 to 10. <i>Infusum Anthemidis.</i> Chamomile, $\frac{1}{2}$ } Infuse 15 mi- Boiling water, 10 } nutes, and Dose.— $\frac{3}{4}$ 1 to 2; 5 to 10 as emetic. } strain. <i>Oleum Anthemidis.</i> (See OILS). ACTION.—Stomachic tonic. Aromatic. Anthelmintic. Emetic.
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Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
2. SAMBUCI FLORES— ELDER FLOWERS. — SAMBUCUS NIGRA. — N.O. CAPRIFOLIACEÆ. — The fresh flowers.	a. Small flowers, crowded on 5 parted cymes. b. White colour. c. Fragrant odour.	<i>Aqua Sambuci.</i> Fresh elder flowers, 1 } Distil 1. Water, 2 ACTION.—Merely used as a ve- hicle.

C. PETALS.

1. RHEADOS PETALA— RED POPPY PETALS. — PAPAVER RHEAS — N.O. PAPAVERACEÆ. — The fresh petals.	a. Bright-scarlet when fresh; dusky-red on drying. b. Narcotic, heavy, poppy-like odour, lost in drying. c. Slightly bitter taste.	<i>Syrupus Rheados.</i> Made by treating the petals with water; macerating for 12 hours, pressing, and straining; dis- solving refined sugar by heat; adding rectified spirit and water to a certain proportion. <i>Dose.</i> —3 1 to 2. ACTION.—Feebly opiate. Chiefly used for colouring mixtures.
2. ROSÆ CENTIFOLIÆ PETALA— CABBAGE- ROSE PETALS — ROSA CENTIFOLIA. — N.O. ROSACEÆ. — The fresh petals fully expanded.	a. Roseate odour, di- minished by drying. b. Taste sweetish, bit- ter, and faintly as- tringent.	<i>Aqua Rosæ.</i> Fresh petals, 1 } Distil 1. Water, 2 ACTION.—Merely used as a plea- sant vehicle.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
3. ROSÆ GALLICÆ PETALA— RED-ROSE PETALS. — ROSA GALLICA. — N.O. ROSACEÆ. The unexpanded petals dried.	a. Purplish-red colour. b. Roseate odour; developed by drying. c. Taste bitterish, feebly acid, and astringent.	<i>Confectio Rosa Gallica.</i> Fresh petals, 1 { Beat the petals Refined sugar, 3 { into a pulp, and mix. <i>Dose.</i> —gr. 30 to 60 or more. <i>Infusum Rosa Acidum.</i> Dried petals, 1 { Infuse $\frac{1}{2}$ an Diluted sulphuric { hour, and acid, $\frac{1}{2}$ { strain. Boiling water, 40 <i>Syrupus Rosa.</i> Made by infusing rose petals in boiling water for 2 hours; squeezing through calico; heat- ing to the boiling point; filter- ing; and dissolving refined sugar with heat. <i>Dose.</i> —3 r to 2. ACTION.—Used mainly as a co- louring agent; and the confec- tion for making pills. Mildly astringent.

D. STYLE AND STIGMA.

1. CROCUS— SAFFRON. — CROCUS SATIVA. — N.O. IRIDACEÆ. The dried stigma with part of the style.	a. Thread-like style, with 3 long stigmas at the end; broadest at the summit. b. Either loosely dried (<i>hay-saffron</i>); or dried under pressure (<i>cake-saffron</i>). c. Yellow; stigmas are orange-brown. Rubbed on the wet finger saffron leaves an intense orange-yellow colour. d. Powerful aromatic odour.	<i>Tinctura Croci.</i> Saffron, 1 { Macerate 48 Proof spirit, 20 { hours, and per- colate. <i>Dose.</i> —3 $\frac{1}{2}$ to 2. ACTION.—Slightly stimulant. Chiefly used as a colouring and flavouring agent.
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E. STROBILUS OR CATKIN.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
1. LUPULUS— HOP. — HUMULUS LUPULUS. — N.O. CANNABINACEÆ. — The dried strobiles of the female plant.	a. Thin, semi-transparent, membranous, and veined scales. b. Greenish-yellow colour, with minute yellow grains at the base, and covering the surface of the scales = <i>Lupulina</i> , forming a golden-yellow powder, like pollen. c. Aromatic odour. d. Bitter taste.	<i>Extractum Lupuli.</i> Made by first acting upon hop by rectified spirit, and producing a soft alcoholic extract; then making a watery extract of the residual hop; mixing the two; and evaporating under 140°. <i>Dose.</i> —gr. 5 to 10. <i>Infusum Lupuli.</i> Hop, 1 Boiling water, 20 } Infuse 2 hours, } and strain. <i>Dose.</i> — $\frac{3}{4}$ i to 2. <i>Tinctura Lupuli.</i> Hop, 1 } Macerate 48 Proof spirit, 8 } hours, and percolate. ACTION.—Stomachic tonic. Hypnotic.

GROUP IX.—FRUITS.

The *officinal fruits* are very numerous, and they can be conveniently divided into several groups. In many cases no description is required, and a mere enumeration will be sufficient; but some fruits need to be briefly described.

A. ORDINARY FRUITS.

1. FICUS— FIG. — FICUS CARICA. — N.O. MORACEÆ.	The dried fruit = <i>Syconus</i> .	Contained in <i>Confectio Sennæ</i> . ACTION.—Laxative. Demulcent. Nutritious.
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Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
PRUNUM— PRUNE. — PRUNUS DOMESTICA. — N.O. ROSACEÆ.	The dried fruit = <i>Drupe.</i>	Contained in <i>Confectio Senna.</i> ACTION.—Laxative. Nutritious.
3. UVÆ— RAISINS. — VITIS VINIFERA. — N.O. VITACEÆ.	Ripe Spanish grapes, dried either by ex- posure to the sun, or by artificial heat.	ACTION.—Nutritious. Demul- cent.

B. UMBELLIFEROUS FRUITS.

This group includes the fruits belonging to the *N.O. Umbelliferæ*, which are frequently called *seeds*. They are botanically named *cremocarps*, and each cremocarp consists of two symmetrical halves or *mericarps*. They may be enumerated alphabetically thus:—

1. **Anethi Fructus—Dill fruit—Anethum Graveolens.**

2. **Carui Fructus—Caraway—Carum Carui.**

3. **Conium Fructus—Conium fruit—Conium Maculatum.**

4. **Coriandri Fructus—Coriander—Coriandrum Sativum.**

5. **Fœniculi Fructus—Fennel fruit—Fœniculum Dulce.**

(The fruit of **Pimpinella Anisum** or **Aniseed** is one of the officinal sources of **Oleum Anise**, but is not separately used). (*See OILS*).

GENERAL DESCRIPTION.—The Umbelliferous fruits as a class have well-defined characters, as follows:—

1. They are all very small, the largest being only 3 lines long (*Fennel*).
2. They have a more or less elongated shape, except *Coriander*, which is globular.
3. Their colour varies from yellowish-brown to dark-brown, except *Conium*, which is dull-grey.
4. They present *Juga* or minute ridges, varying in number and arrangement; and most of them have one or more *Vittæ* or oil-ducts.
5. Each fruit has a characteristic and peculiar odour and taste, which is of an aromatic character, except in the case of *Conium*.

SPECIAL CHARACTERS.—The several Umbelliferous fruits are distinguished by their exact shape, size, and colour; their *juga* and *vittæ*; and their odour and taste. The student may obtain full information on these points from the more complete works on MATERIA MEDICA. He ought, however, to be so familiar with their *general appearance* and *odour*, as to be able to recognise them at once.

PHARMACY.—The important facts relating to this part of the subject may be thus summarised:—

1. Dill, aniseed, caraway, and coriander, each yield an *official Volatile Oil*. (See OILS).
2. There are three official *Aquæ* made from the fruits, namely:—

a. <i>Aqua Anethi</i>	} Each prepared from	{ Bruised fruit, 1 Water, 20	} Distil 10.
b. <i>Aqua Carui</i>			
c. <i>Aqua Fœniculi</i>			

Dose— $\frac{3}{4}$ i to 2.

3. Caraway and coriander are ingredients in several *official preparations*.

4. Conium fruit has a special preparation, namely:—

Tinctura Conii.

Conium fruit, 1 } Macerate 48 hours, and
Proof spirit, 8 } percolate.

Dose—3 $\frac{1}{2}$ to 1.

ACTION.—1. The aromatic group are all stimulant and carminative; and are used also as flavouring agents. 2. Conium fruit has special actions (*see CONIUM LEAVES*).

C. SPECIAL FRUITS.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
1. BELÆ FRUCTUS— BAEL FRUIT. — ÆGLE MARMELOS — N.O. AURANTIACEÆ. — The dried half- ripe fruit.	<p>a. Roundish; about the size of a large orange.</p> <p>b. Usually in dried slices or fragments, with adhering pulp and seeds.</p> <p>c. The rind is hard and woody, $1\frac{1}{2}$ line thick.</p> <p>d. Externally, smooth; pale-brown or greyish.</p> <p>e. Internally, the rind and pulp are brownish-orange or cherry-red.</p>	<p><i>Extractum Bela Liquidum.</i> Prepared by first making a watery extract; pressing, filtering, and evaporating; and adding rectified spirit.</p> <p><i>Dose.</i>—3 to 2.</p> <p>ACTION.—Astringent; chiefly used in diarrhoea and dysentery.</p>
2. CAPSICI FRUCTUS— CAPSICUM FRUIT. — CAPSICUM FASTIGIATUM. — N.O. SOLANACEÆ. — The dried ripe fruit. (The powder forms <i>Cayenne-pepper</i>).	<p>a. Small membranous pods, divided into 2 or 3 cells, containing some spongy pulp, and numerous, white, flat, reniform seeds.</p> <p>b. Conical or cylindrical; straight, and pointed.</p> <p>c. Orange-red or bright scarlet; smooth or corrugated; shining.</p> <p>d. No odour; taste, hot and acrid.</p>	<p><i>Tinctura Capsici.</i> Capsicum, $\frac{1}{2}$ } Macerate 48 Rectified spirit, 20 } hours, and percolate.</p> <p><i>Dose.</i>—m 10 to 20. <i>Of Powder</i>, gr. $\frac{1}{2}$ to 1.</p> <p>ACTION.—Rubefacient. Stimulant. Used as a condiment.</p>

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
6. PIMENTA— PIMENTO. — EUGENIA PIMENTA. — N.O. MYRTACEÆ. — The dried unripe berries.	a. About the size of a small pea. b. Globular; crowned with the teeth of the calyx. c. Brown and rough externally. d. Yellowish internally; and contains two dark - brown seeds. e. Odour, peculiar and aromatic. f. Taste, hot and aromatic.	<i>Aqua Pimenta.</i> Pimento, 7 } Distil one-half. Water, 160 } Dose.— $\frac{3}{4}$ 1 to 2. <i>Oleum Pimenta.</i> (See OILS). ACTION.—Aromatic. Gastric stimulant. Carminative.
7. PIPER NIGRUM— BLACK PEPPER. — PIPER NIGRUM. — N.O. PIPERACEÆ. — The dried unripe berries. (White pepper is the ripened berry decorticated).	a. About the size of a pea. b. Roundish; no stalk. c. Externally, brownish-black and wrinkled. d. Contains a greyish-yellow, globular seed. e. Characteristic aromatic odour. f. Taste, pungent and bitterish.	<i>Confectio Piperis.</i> Black pepper, 2 } Triturate, Caraway, 3 } and mix Clarified honey, 15 } Dose.—gr. 60 to 120. ACTION.—Gastric stimulant. Carminative. Used as a condiment. Has a special action on the genito-urinary mucous membrane, similar to cubebs.
8. ROSÆ CANINÆ FRUCTUS— DOG-ROSE FRUIT. HIPS. — — ROSA CANINA. — — N.O. ROSACEÆ. — The fresh fruit, deprived of the hairy seeds (Achenes).	a. Ovate; an inch or more long. b. Scarlet or crimson; smooth and shining. c. Succulent; with a sweetish, acidulous pulp.	<i>Confectio Rosæ Caninæ.</i> Hips, deprived } Beat into a of seeds, 1 } pulp, and mix. Refined sugar 2 } Dose— $\frac{3}{4}$ 1 or more. ACTION.—Refrigerant. Astringent.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
9. SABADILLA —CEVADILLA. — ASSAGRÆA OFFICINALIS. — N.O. MELANTHACEÆ. — The dried fruit.	a. About $\frac{1}{2}$ an inch long. b. Consists of 3 follicles; papyraceous and light-brown. c. One to three seeds in each follicle:— (i) About $\frac{1}{2}$ inch long. (ii) Slightly winged. (iii) Blackish-brown and shining. (iv) Intensely acrid bitter taste.	The source of <i>Veratria</i> . (See ALKALOIDS). ACTION.—Acrid, drastic cathartic. Emetic. Vascular depressant. Sternutatory. Local anodyne.

D. PULP OF FRUITS.

1. CASSIÆ PULPA— CASSIA PULP. — CASSIA FISTULA OF PURGING CASSIA. — N.O. LEGUMINOSÆ. — The pulp of the pods, imported, or recently ex- tracted.	a. The fruit is a long, cylindrical, <i>pod</i> or <i>lomentum</i> , with 3 bands running along it, and divided into cells, each containing the pulp and a seed. b. The pulp is blackish-brown; viscid; sweet; with a rather sickly odour.	Contained in <i>Confectio Sennæ</i> . <i>Dose</i> .— $\frac{3}{4}$ i to 2. ACTION.—Laxative.
2. TAMARINDUS —TAMARIND. — TAMARINDUS INDICA. — N.O. LEGUMINOSÆ. — The pulp pre- served in sugar.	a. Brown in colour. b. Sweetish and acidulous taste. c. Contains strong fibres and seeds.	Contained in <i>Confectio Sennæ</i> . ACTION.—Refrigerant. Slightly laxative.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
3. COLOCYN- THIDIS PULPA— COLOCYNTH PULP. — CITRULLUS COLOCYNTHIS. — N.O. CUCURBITACEÆ. — The dried and decorticated fruit, freed from the seeds. — Peeled = Turkey. Unpeeled = Mo- gadore.	a. The complete fruit is a <i>globular pepo</i> ; about the size of an orange; with a hard yellow rind; and en- closing the pulp and seeds. b. <i>Pulp (Turkey)</i> :— (i) In balls, more or less round, about 3 inches in diameter, bearing the marks made in cutting away the rind. (ii) Light and spongy texture. (iii) White or yellow- ish-white. (iv) Intensely bitter taste; inodorous. c. <i>Seeds</i> , 66 to 72 per cent.; oval; smooth; white or yellowish- white to brown in colour.	<i>Extractum Colocynthis Com- positum.</i> a. Make a tincture by macerat- ing colocynth in proof spirit for 4 days. Press and distil off the spirit. b. Add { Extract of socotrine aloes. Resin of scammony. Hard soap. c. Evaporate by a water-bath to a pilular consistence, adding powdered cardamoms towards the end of the process. <i>Dose</i> .—gr. 2 to 8. <i>Pilula Colocynthis Composita.</i> Colocynth, 1 Barbadoes aloes, 2 Scammony, 2 Sulphate of potash, $\frac{1}{2}$ Oil of cloves, $\frac{1}{2}$ Water, q.s. <i>Dose</i> .—gr. 5 to 10 Powder, and mix. <i>Pilula Colocynthis et Hyoscyami.</i> Prepared as above, with Extract of Hyoscyamus, 3, added. <i>Dose</i> .—gr. 5 to 10. ACTION.—Drastic purgative.

E. RIND OF FRUITS.

The drugs which come under this head are the rinds of the Orange and Lemon fruit. This fruit is botanically named a *Hesperidium*, and its characters are so well-known that no description is necessary. The rind contains a large number of oil-vesicles; and is aromatic and bitter.

1. Aurantii Cortex — Bitter Orange-peel.
From **Citrus Bigaradia**. *N.O. Aurantiaceæ.*

a. The fresh outer part of the rind of the ripe fruit of bitter orange. *b.* The same dried.

PHARMACY. 1. *Official preparations:—*

Infusum Aurantii.

Dried peel, 1	} Infuse 15 minutes, and strain. Dose— $\frac{3}{4}$ 1 to 2.
Boiling water, 20	

Infusum Aurantii Compositum.

Dried peel, $\frac{3}{4}$	} Infuse 15 minutes, and strain. Dose— $\frac{3}{4}$ 1 to 2.
Fresh lemon-peel, gr. 120	
Cloves, gr. 60	
Boiling water, $\frac{3}{4}$ 20	

Syrupus Aurantii.

Tincture of orange, 1	} Mix. Dose— $\frac{3}{4}$ 1 to 2.
Syrup, 7	

Tinctura Aurantii.

Dried peel, 1	} Macerate 7 days, strain, and make up to 10. Dose— $\frac{3}{4}$ 1 to 2.
Proof spirit, 10	

Tinctura Aurantii Recentis.

Fresh peel, $\frac{3}{4}$ 6	} Digest 7 days; and strain. Dose— $\frac{3}{4}$ 1 to 2.
Rectified spirit, $\frac{3}{4}$ 10	

Vinum Aurantii.—Made by fermenting a saccharine solution containing fresh peel of bitter orange. It contains about 12 per cent. of alcohol; and is used in making *Vinum Ferri Citratis* and *Vinum Quiniæ*.

2. Bitter orange peel is an ingredient in *Infusum Gentianæ Compositum*, *Mistura Gentianæ*, and *Tinctura Gentianæ Composita*; in *Spiritus Armo-racæ Compositus*; and in *Tinctura Cinchonæ Composita*.

ACTION.—Aromatic. Carminative. Mild tonic.

2. Limonis Cortex — Lemon-peel. From **Citrus Limonum**. *N.O. Aurantiaceæ.*

The fresh outer part of the rind of the lemon.

PHARMACY.—1. *Official preparations:—*

Oleum Limonis. (See OILS).

Syrupus Limonis.—Made by boiling lemon-juice, adding lemon-peel, and allowing the liquid to cool; filtering, and dissolving refined sugar with a gentle heat.

Dose—3 i to 2.

Tinctura Limonis.

Fresh lemon-peel, 1 } Macerate 7 days; and
Proof spirit, 8 } strain. *Dose*—3 ½ to 2.

2. Lemon peel is contained in *Infusum Aurantii Compositum*, and *Infusum Gentianæ Compositum*.

ACTION.—Aromatic. Carminative.

F. JUICES OF FRUITS.

It will be sufficient to enumerate the juices of fruits used medicinally, as follows:—

1. *Limonis Succus*—Lemon juice.

The *freshly expressed juice* of the ripe fruit of the lemon. Yellowish and slightly turbid; has a peculiar odour, and a sharp sour taste.

PHARMACY.—Lemon-juice is used in making *Syrupus Limonis*. It is the source of citric acid, and contains about gr. 16-25 in 3 ½.

ACTION.—Refrigerant. Antiscorbutic. Chiefly used in making effervescent draughts.

2. *Mori Succus*—Mulberry juice.

The *juice of the ripe fruit* of *Morus Nigra*. *N.O. Moraceæ*. Deep purple or violet colour; has a faint odour, and an acidulous sweet taste.

Syrupus Mori.—Made by boiling mulberry juice; filtering when cool; dissolving refined sugar by a gentle heat; and adding rectified spirit.

Dose—3 i to 2.

ACTION.—Refrigerant. Laxative.

3. *Rhamni Succus*—Buckthorn juice.

The *recently-expressed juice* of the ripe berries of *Rhamnus Catharticus*. *N.O. Rhamnaceæ*. Green; has a nauseous odour.

Syrupus Rhamni.—Made by evaporating buckthorn juice; adding ginger and pimento; digesting for four hours at a gentle heat, and straining when cold; adding rectified spirit; decanting in 2 days; and dissolving refined sugar with a gentle heat. *Dose*—3 i.

ACTION.—Powerful cathartic.

G. SPECIAL DRUGS FROM FRUITS.

1. **Kamala—Wurrus.** From **Rottlera Tincoria.** *N.O. Euphorbiaceæ.* *Minute glands adhering to the capsules.*

CHARACTERS AND PROPERTIES:—

a. A fine, granular, mobile powder.
b. Bright-red or orange-red colour; not uniform throughout.

c. Is with difficulty mixed with water; the greater part is dissolved when boiled in alcohol, forming a red solution; ether also dissolves most of it, the residue consisting principally of tufted hairs.

d. Microscopically kamala shows rounded semi-transparent granules, and stellate hairs.

e. It should be free from sand and earthy impurities.

Dose—gr. 30 to 120, in treacle, syrup, mucilage, or gruel.

ACTION.—Anthelmintic, for tape-worm. **Purgative.**

The other drugs belonging to this sub-division will only be mentioned at present, being more conveniently discussed later on. They include:—

2. **Oleum Anisi.**
 3. **Oleum Juniperi.** } *See OILS.*

4. **Elaterium**—The deposit from the juice of **Ecballium officinarum.**

5. **Ergot.**—The diseased grain of **Secale Cereale** or **Common Rye.**

GROUP X.—SEEDS.

The seeds recognised in the B.P. may also be conveniently subdivided into groups.

A. LARGE SEEDS.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
1. AMYGDALA —ALMOND. — AMYGDALA DULCIS— SWEET ALMOND.	a. Sweet almond is about an inch long, lanceolate; bitter almond is shorter and broader. b. Cinnamon - brown coat, easily removed by steeping in warm water = "blanched almonds."	<i>Mistura Amygdalæ.</i> Compound powder of almonds, 1 Water, 8 Dose.— $\frac{5}{8}$ i to 2. Triturate and strain.
— AMYGDALA AMARA— BITTER ALMOND. — N.O. ROSACEÆ. — The seeds.	c. Kernel is white, dry, and brittle. d. No odour when dry; when rubbed with water the bitter almond emits a characteristic odour. e. Taste :— Sweet almond = bland, sweetish, nutty. Bitter almond = bitter and peculiar.	<i>Pulvis Amygdalæ Compositus.</i> Blanched sweet almonds, 8 Refined sugar, 4 Gum acacia, 1 Rub the almonds to a paste; add sugar and gum; pass through a coarse sieve. Dose.—gr. 60 to 120.
		<i>Oleum Amygdalæ.</i> A fixed oil, obtained by expression from both varieties. (See OILS). (Oil of Bitter Almonds is not officinal, but is the volatile oil obtained by distilling with water the cake which remains after the fixed oil has been expressed; it results from the action of <i>emulsin</i> upon <i>amygdalin</i> . It contains <i>hydrocyanic acid</i> .) ACTION.—Demulcent. Nutritive. Bitter almond is poisonous, but is only officinally recognized as a source of the fixed oil.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
2. ARECA— ARECA NUT or BETEL NUT. — ARECA CATECHU. — N.O. PALMACEÆ. — The seeds.	a. About the size and shape of a horse-chestnut. b. Rusty-grey colour; tessellated surface; with a well-marked hilum. c. Very hard consistence. d. Section presents a ruminated appearance, like nutmeg. e. No odour; astringent taste.	No official preparation. Dose.— $\frac{3}{4}$ to $\frac{1}{2}$. ACTION.—Anthelmintic. Astringent.
3. MYRISTICA —NUTMEG. — MYRISTICA OFFICINALIS. — N.O. MYRISTICACEÆ. — The kernel of the seed.	a. Oval or nearly round. b. About an inch long. c. Externally, marked with reticulated furrows. d. Section is greyish-red with dark-brownish veins—"ruminated." e. Strong and characteristic odour. f. Bitter, aromatic taste.	<i>Oleum Myristica</i> .—The volatile oil. (See OILS). <i>Oleum Myristica Expressum</i> .—A concrete oil. (See OILS). <i>Spiritus Myristica</i> . Volatile oil of nutmeg, 1 } Dissolve. Rectified spirit, 49 } Dose.—M 30 to 60. ACTION.—Aromatic. Carminative. Stimulant.
4. NUX VOMICA. — STRYCHNOS NUX VOMICA. — N.O. LOGANIACEÆ. — The seeds.	a. Almost circular; about an inch in diameter. b. Flat discs, but umbilicated and slightly convex on one surface. c. Externally, ash-grey colour; thickly covered with short satiny hairs. d. Internally, translucent. e. Tough and horny, and very difficult to powder; must be previously steamed well and dried rapidly. f. No odour; intensely bitter taste. g. Powder is greyish-yellow.	<i>Extractum Nucis Vomica</i> . A spirituous extract, made by first steaming, drying rapidly, and powdering nux vomica; boiling with rectified spirit; straining; distilling off the spirit; and evaporating. Dose.—gr. $\frac{1}{2}$ to 1. <i>Tinctura Nucis Vomica</i> . Powdered nux vomica, 1 } Macerate 48 Rectified spirit, 10 } hours, and Dose.—M 10 to 30. percolate. Nux Vomica is the source of STRYCHNIA. (See ALKALOIDS). ACTION.—Tonic. Laxative. Nervine stimulant or excitant, especially spinal. Tetanizer. (See STRYCHNIA).

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
5. PHYSO-STIGMATIS FABA—CALABAR BEAN. PHYSOSTIGMA VENENOSUM. N.O. LEGUMINOSÆ. The seeds.	<i>a.</i> Irregularly kidney-shaped, with 2 flat surfaces, and a longitudinal furrow along the convex margin, ending in an aperture near one end. <i>b.</i> About the size of a very large horse-bean. <i>c.</i> Shining integument, brownish-red, pale-chocolate, or ash-grey; very firm and hard, but brittle. <i>d.</i> Kernel = 2 cotyledons, white, hard, but pulverizable. <i>e.</i> Taste, like that of ordinary leguminous seeds.	<i>Extractum Physostigmatis.</i> A spirituous extract, made with Rectified spirit, by maceration, percolation, distilling off most of the spirit, and evaporating. <i>Dose.</i> —gr. $\frac{1}{16}$ to $\frac{1}{4}$. ACTION. —Myositic (contracts the pupil of the eye, &c.). Spinal sedative or depressant and paralysar. Cardiac sedative and depressant.

B. SMALL SEEDS.

1. CARDAMOMUM—CARDAMOMS. Elettaria CARDAMOMUM. N.O. ZINGIBERACÆ. The seeds (seen generally contained in thin pale-brown coriaceous pericarps).	<i>a.</i> Obtusely angular in shape. <i>b.</i> Externally, reddish-brown; corrugated. <i>c.</i> Internally, white. <i>d.</i> Odour, aromatic and agreeable. <i>e.</i> Taste, aromatic and warm.	<i>Tinctura Cardamomi Composita.</i> Cardamom seeds, $\frac{3}{4}$ i Caraway, $\frac{3}{4}$ i Raisins, $\frac{3}{4}$ 8 Cinnamon, $\frac{3}{4}$ 2 Cochineal, gr. 240 Proof spirit, $\frac{3}{4}$ 80 <i>Dose.</i> — $\frac{3}{4}$ i to 2. Cardamoms or its Tincture are contained in several official preparations. ACTION. —Carminative. Aromatic stimulant.
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Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
2. COLCHICI SEMINA— COLCHICUM SEEDS. — COLCHICUM AUTUMNALE. — N.O. MELANTHACEÆ. — The seeds.	<p>a. Small; about the size of white mustard-seeds; rather larger than black mustard.</p> <p>b. Spherical in shape.</p> <p>c. Reddish-brown colour (<i>lighter than black mustard</i>); rough externally.</p> <p>d. Very hard.</p>	<p><i>Tinctura Colchici Seminum.</i></p> <p>Colchicum seeds, 1 } Macerate 48 Proof spirit, 8 } hours; and percolate.</p> <p>Dose.—m 10 to 30.</p> <p>ACTION.—Diaphoretic. Diuretic. Alterative. Intestinal and hepatic stimulant. Cardiac depressant. Specific for gout.</p>
3. SINAPIS— MUSTARD. — SINAPIS ALBA et NIGRA— WHITE and BLACK MUSTARD — N.O. CRUCIFERÆ. — Mustard consists of the <i>mixed</i> seeds, reduced to powder.	<p>a. Small and round; <i>white</i> the larger.</p> <p>b. Externally:— <i>Black</i> = brownish-black, wrinkled. <i>White</i> = yellowish-brown.</p> <p>c. Internally, both are yellowish-white.</p> <p>d. Powder=MUSTARD: (i) Greenish-yellow. (ii) No odour when dry; gives, when moist, a peculiar, penetrating, pungent odour; is very irritating to the nostrils and eyes. (iii) Acrid, pungent, bitterish, and oily taste.</p> <p>e. Test.—A decoction of mustard cooled is not made blue by <i>tincture of iodine</i> = absence of starch.</p>	<p><i>Cataplasma Sinapis.</i></p> <p>Mustard, 2½ } <i>Mix the lin-</i> Linseed-meal, 2½ } <i>seed-meal with</i> Boiling water, 10 } <i>the water, and</i> then add the mustard.</p> <p><i>Charta Sinapis.</i></p> <p>a. Mix { Black mustard-seeds, in powder, 3 i Solution of gutta-per- cha, 3 2.</p> <p>b. Pour into a shallow, flat-bottomed vessel, and pass strips of cartridge paper over its surface, so that one surface receives a thin coating.</p> <p>c. Dry by exposure to air. (To be immersed in tepid water before application.)</p> <p><i>Linimentum Sinapis Compositum.</i></p> <p>Oil of mustard, 3 i Ethereal extract of mezereon, gr. 40 } Camphor, gr. 120 } Dissolve. Castor oil, 3 5 Rectified spirit, 3 32</p> <p><i>Oleum Sinapis.</i> Volatile oil distilled with water from <i>black</i> mustard. (<i>See Oils</i>).</p> <p>ACTION.—Rubefacient. Vesicant. Powerful stimulant. Condiment. Emetic in doses of a teaspoonful to a tablespoonful.</p>

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
4. STRAMONII SEMINA— STRAMONIUM SEEDS. — DATURA STRAMONIUM — N.O. ATROFACÆ. — The seeds.	a. Reniform and flat- tened. b. Externally, brown- ish-black and rough. c. Peculiar heavy odour when bruised. d. Feebly bitter, mawk- ish taste.	<i>Extractum Stramonii.</i> Made by first percolating coarse- ly-powdered stramonium seeds with <i>washed ether</i> , to <i>remove</i> <i>the oil</i> ; and then with <i>proof</i> <i>spirit</i> , until the seeds are ex- hausted, the spirit being dis- tilled off, and the residue eva- porated. <i>Dose.</i> —gr. $\frac{1}{2}$, gradually increased. <i>Tinctura Stramonii.</i> Stramonium seeds, 1 } Macerate 48 Proof spirit, 8 } hours, and percolate. <i>Dose.</i> —m 10 to 20. <i>Incompatibles.</i> —Mineral acids; caustic alkalies; metallic salts. <i>ACTION.</i> —Antispasmodic. Pul- monary sedative. Anodyne. Mydriatic.
5. HORDEUM DECORTICA- TUM— PEARL BARLEY. — HORDEUM DISTICHON. — N.O. GRAMINACÆ. — The husked seeds.	a. Round, with a trace of a longitudinal fis- sure. b. White colour and polished surface.	<i>Decoctum Hordei.</i> Washed barley, 1 } Boil 20 minutes Water, 15 } in a covered vessel, and strain. <i>Dose.</i> — <i>Ad libitum.</i> <i>ACTION.</i> —Demulcent. Nutrient

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
6. LINUM. — LINUM USITATISSIMUM. — N.O. LINACEÆ.	a. The seeds are small, oval, oblong, and flattened; pointed at one end, with acute edges. b. Externally, smooth, shining, dark-brown testa.	<i>Cataplasma Lini.</i> a. Mix { Linseed meal, 4 Boiling water, 10. b. Add olive oil, $\frac{1}{2}$, stirring.
a. LINI SEMINA —LINSEED. The seeds.	c. Internally, yellowish-white.	<i>Infusum Lini.</i> Linseed, gr. 160 Liquorice root, gr. 60 } Infuse 4 Boiling water, $\frac{1}{3}$ 10 } hours, and strain.
b. LINI FARINA —LINSEED-MEAL. The seeds, ground and deprived of their oil by expression, and the cakes reduced to powder.	d. No odour; oily and mucilaginous taste. e. When the oil is expressed, a firm, coherent mass remains = <i>oil-cake</i> , which when powdered forms <i>linseed-meal</i> .	<i>Oleum Lini.</i> —The expressed oil. (See OILS). <i>Incompatibles.</i> —The infusion of linseed is incompatible with preparations of lead, iron, and most metallic salts.
		ACTION. — Demulcent. Emollient.

C. GROUND SEEDS.

These may be simply enumerated, as follows:—

1. **Lini Farina.** (See LINUM).
2. **Sinapis—Mustard.** (See SINAPIS).
3. **Farina Triticæ—Wheaten flour.** **Triticum Vulgare.** N.O. Graminaceæ. The grain of wheat, ground and sifted. Used for making *Cataplasma Fermenti*.

D. SPECIAL DRUGS FROM SEEDS.

1. **Gossypium—Cotton-wool.** N.O. Malvaceæ. *Hairs of the seeds* of various species of GOSSYPIMUM, carded. Used for making Pyroxylin.
2. *Oils derived from seeds.*
 - a. **Oleum Crotonis—Croton Oil.**
From **Croton Tiglium.**
 - b. **Oleum Ricini—Castor Oil.**
From **Ricinus Communis.**
 - c. **Oleum Theobromæ—Oil of Theobroma.** A concrete oil from **Theobroma Cacao.**

} See OILS.

GROUP XI.—SPECIAL PARTS OF PLANTS.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
1. COLCHICI CORMUS— COLCHICUM CORM. — COLCHICUM AUTUMNALE. — N.O. MELANTHACEÆ.	(i) <i>Complete Corm.</i> a. About the size of a chestnut. b. Convex and flattened or slightly concave; with an undeveloped bud at the base. c. Has an external brown and membranous, and an inner yellow coat. d. Internally, white, solid, and fleshy. e. When cut yields a milky, bitter, and acrid juice.	<i>Extractum Colchici.</i> Made from the expressed juice of fresh <i>colchicum</i> corms, heated to 212°, strained, and evaporated. <i>Dose.</i> —gr. $\frac{1}{2}$ to 2.
The fresh corm stripped of its coats, sliced transversely, and dried under 150°.	(ii) <i>Slices.</i> a. Somewhat oval, and flattened or moderately indented on one side. b. About a line thick; flat. c. Firm in texture; presents a whitish and starchy appearance. d. Bitter and acrid taste.	<i>Extractum Colchici Aceticum.</i> Made by stirring { Crushed fresh corms, 112 } together { Acetic acid, 6 } ; pressing; after subsidence heating the clear liquor to 212°; straining through flannel; and evaporating at 160°. <i>Dose.</i> —gr. $\frac{1}{2}$ to 2.
		<i>Vinum Colchici.</i> Dried sliced corms, 4 } Macerate 7 days, strain, Sherry wine, 20 } and make up to 20. <i>Dose.</i> —m 10 to 30.
		<i>Incompatibles.</i> —Tincture of iodine; guaiacum; all astringent preparations.
		ACTION. —Similar to <i>Colchicum</i> seeds. (See SEEDS).
2. JALAPA— JALAP. — EXOGENIUM PURGA. — N.O. CONVOLVULACEÆ	a. Ovoid, and more or less pointed at the ends; sometimes irregular. b. From a nut to an orange in size; $\frac{1}{2}$ to 3 or 4 inches in diameter. c. The larger tubers are often incised, for the purpose of drying them.	<i>Extractum Jalapæ.</i> Prepared by first making a tincture with rectified spirit, by macerating jalap for 7 days, and distilling off the spirit, leaving a soft extract; making a watery extract with the residual jalap; mixing the two; and evaporating under 140°. <i>Dose.</i> —gr. 5 to 15.
The dried tubercles or tubers.		

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
JALAP. (continued).	d. Externally, a thick, brown, wrinkled cuticle.	<i>Pulvis Jalapæ Compositus.</i> Jalap, 5 Cream of tartar, 9 } Powder, and Ginger, 1 } mix. <i>Dose.</i> —gr. 20 to 60.
	e. Section is yellowish-grey, with dark-brown concentric circles.	
	f. Dense and hard texture; sometimes worm-eaten.	<i>Resina Jalapæ.</i> (See RESINS).
	g. Sweetish, but nauseous odour and taste.	<i>Tinctura Jalapæ.</i> Jalap, 1 } Macerate 48 hours, Proof spirit, 8 } and percolate. <i>Dose.</i> —3 $\frac{1}{2}$ to 2.
		ACTION.—Purgative. Vermifuge.
3. SCILLA— SQUILL. — URGINEA SCILLA. — N.O. LILIACEÆ. — The bulb, sliced and dried.	(1) <i>Entire Bulb.</i>	<i>Acetum Scillæ.</i>
	a. From the size of the fist upwards; $\frac{1}{2}$ -lb to 10 lbs in weight.	Dried Squill, 2 $\frac{1}{2}$ } Macerate Diluted acetic acid, 20 } 7 days, and press.
	b. Pear-shaped.	Add Proof spirit, 1 $\frac{1}{2}$, and filter.
	c. Consists of overlapping scales. The outer are thin, membranous, brownish-red or white; the inner—white, thick, fleshy, and juicy. (The middle layers are used).	<i>Oxymel Scillæ.</i> Vinegar of squill, 5 } Mix and Clarified honey, 8 } evaporate. <i>Dose.</i> —3 $\frac{1}{2}$ to 1.
	(2) <i>Dried Slices.</i>	<i>Pilula Scillæ Composita.</i>
	a. In thin pieces or strips.	Squill, 1 $\frac{1}{2}$ } Powder, mix, Ginger, 1 } and add the Ammoniacum, 1 } treacle. Hard Soap, 1 } Treacle, 2 } <i>Dose.</i> —gr. 5 to 10.
	b. White or yellowish-white.	
	c. Slightly translucent and horny.	<i>Syrupus Scillæ.</i> Vinegar of squill, 20 } Dissolve Refined sugar, 40 } with heat. <i>Dose.</i> —3 $\frac{1}{2}$ to 1.
	d. Brittle and easily powdered, if very dry, but readily becomes moist and flexible if exposed to air.	<i>Tinctura Scillæ.</i> Squill 1, } Macerate 48 hours, Proof spirit, 8 } and percolate. <i>Dose.</i> — \mathfrak{M} 15 to 30.
	e. No odour. Taste disagreeable, bitter, and somewhat acrid.	ACTION.—Stimulant expectorant. Diuretic. Emetic in large doses. Cardiac tonic.

GROUP XII.—DISEASED PLANTS.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
1. ERGOTA — ERGOT. — SECALE CORNUTUM — SPURRED RYE. — N.O. GRAMINACEÆ.	<p><i>a.</i> Elongated and curved; obtuse at the ends; sub-triangular; with a longitudinal furrow on the concave side.</p> <p><i>b.</i> $\frac{3}{4}$ to $1\frac{1}{2}$ inch in length.</p> <p><i>c.</i> Externally, violet-brown.</p> <p><i>d.</i> Internally, pinkish.</p> <p><i>e.</i> Solid; easily broken, with a short fracture.</p> <p><i>f.</i> Faint, peculiar odour, brought out strongly if the powder is triturated with solution of potash.</p>	<p><i>Extractum Ergotæ Liquidum.</i> Made by first slowly percolating ergot with washed ether, to remove the oil; preparing a watery extract, by digesting at 160° for 12 hours, pressing, and evaporating; and finally adding rectified spirit when cold, filtering in an hour, and making up to a certain quantity.</p> <p><i>Dose.</i>—\mathbb{M} 10 to 60.</p> <p><i>Infusum Ergotæ.</i> Ergot, 1 Boiling water, 40 } Infuse $\frac{1}{2}$ an hour, and strain <i>Dose.</i>—$\mathbb{3}$ 1 to 2.</p> <p><i>Tinctura Ergotæ.</i> Ergot, 1 Proofspirit, 4 } Macerate 48 hours, and percolate. <i>Dose.</i>—\mathbb{M} 15 to 60.</p> <p><i>Incompatibles.</i>—Astringents; metallic salts.</p> <p><i>ACTION.</i>—Ecbolic. Emmenagogue. Vaso-contractor Hæmostatic.</p>
2. GALLA — GALLS. — QUERCUS INFECTORIA. — N.O. CUPULIFERÆ.	<p><i>a.</i> Globular and tuberculated in shape.</p> <p><i>b.</i> Variable in size; usually from $\frac{1}{4}$ to 1 inch in diameter.</p> <p><i>c.</i> Hard and heavy; easily powdered.</p> <p><i>d. Blue galls:</i>— (i) Externally, bluish-green. (ii) Internally, yellowish-white. (iii) No aperture; a small central cavity.</p> <p><i>e. White galls (inferior).</i> (i) Paler; greyish. (ii) Generally present a small circular aperture, through which the insect has escaped.</p> <p><i>f.</i> No odour. Taste, very astringent, especially the blue galls.</p> <p><i>g.</i> All the soluble matters in galls are taken up by 40 times their weight of boiling water, and the residue is tasteless. Partly soluble in alcohol and ether</p>	<p><i>Tinctura Gallæ.</i> Galls, 1 Proofspirit, 8 } Macerate 48 hours, and percolate. <i>Dose.</i>—$\mathbb{3}$ $\frac{1}{2}$ to 2.</p> <p><i>Unguentum Gallæ.</i> Galls, in fine powder, gr. 80 Benzoated lard, $\mathbb{3}$ 1 } Mix.</p> <p><i>Unguentum Gallæ cum Opio.</i> Ointment of galls, $\mathbb{3}$ 1 Powdered opium, gr. 32 } Mix.</p> <p><i>Gall-nuts</i> are the source of:— <i>Acidum Gallicum</i> <i>Acidum Tannicum.</i></p> <p><i>Incompatibles.</i>—Mineral acids; alkaline carbonates; lime-water; salts of iron, lead, copper, and silver; tartar emetic; ipecacuanha; opium; infusions of cinchona, calumba, and cusparia.</p> <p><i>ACTION.</i>—Powerful astringent.</p>

Excrescences on the tender branches and young shoots of the *Quercus Insectoria*, produced by the female insect, *Diplolepis Gallæ Tinctoriæ*. This insect pierces and deposits her ova, and the irritation causes a flow of the juice of the plant to the part, producing an enlargement. The insect develops within this, and finally eats its way out.

GROUP XIII.—VEGETABLE PRODUCTS.

I would include in this group drugs which are derived or prepared from plants in different ways, and they naturally subdivide themselves into certain classes.

A. GUMS.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
1. ACACIÆ GUMMI— GUM ACACIA.	a. In spheroidal tears; $\frac{1}{2}$ to 1 inch in diameter.	<i>Mucilago Acacia.</i> Gum acacia, 40 } Dissolve. Water, 60 Dose.—3 i to 4.
— Undetermined species of ACACIA.	b. Nearly colourless; opaque from numerous minute cracks; or in pieces with a shining surface.	Contained in <i>Pulvis Tragacanthæ Compositus</i> .
— N.O. LEGUMINOSÆ.	c. Brittle and pulverizable.	<i>Incompatibles.</i> —Sulphuric acid; alcohol; borax; persalts of iron and subacetate of lead, which render the mucilage gelatinous.
— A gummy exudation from the stem.	d. Soluble in water (1 in 1); insoluble in alcohol, ether, oils.	
	e. Bland and mucilaginous taste.	Action.—Demulcent. Nutritious. Often used to suspend powders, or to form an emulsion; also in making lozenges.
	f. The powder is white. After boiling in water and cooling, it should not be rendered blue by an aqueous solution of iodine = absence of starch.	

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
2. TRAGACANTHA— TRAGACANTH or GUM DRAGON. — ASTRAGALUS VERUS. — N.O. LEGUMINOSÆ.	a. In flakes or plates. b. Broad, shell-like, slightly curved. c. White or yellowish colour. d. Tough and elastic; but more pulveriza- ble when heated to 120°.	<i>Mucilago Tragacantha.</i> Powdered tragacanth, } Diffuse by gr. 60 } frequent Water, 3 10 } agitation. Dose.—3 1 upwards.
A gummy exuda- tion, from the stem. (Not a true secretion, but the result of the transforma- tion of cells of the pith and medullary rays.)	e. Very sparingly solu- ble in cold water, but swells up into a gela- tinous mass, which is tinged violet by tinc- ture of iodine. f. Almost tasteless. g. After maceration in cold water, the fluid portion is not preci- pitated by rectified spirit = absence of acacia; the gelatin- ous mass, boiled and cooled, is not turned blue by tincture of iodine = absence of starch.	<i>Pulvis Tragacantha Compositus.</i> Tragacanth, 1 Acacia, 1 Starch, 1 Refined sugar, 3 } Powder and Dose.—gr. 10 to 60. } mix.
		ACTION.—Demulcent. Chiefly used for suspending heavy in- soluble powders in liquids.

B. RESINS.

1. GUAIACI RESINA— GUAIACUM. — GUAIACUM OFFICINALE. — N.O. ZYGOPHYLLACEÆ	a. In round or oval tears; or in masses (<i>Lump Guaiacum</i>). b. Various sizes; the masses are large.	<i>Mistura Guaiaci.</i> Guaiacum resin, 2 Sugar, 2 Gum acacia, 1 Cinnamon water, 80 } Triturate, Dose.—3 1 to 2. } gradually adding the cinnamon water.
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Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
GUAIAECUM <i>(continued).</i> <p>The resin obtained from the stem :—</p> <p>a. By natural exudation.</p> <p>b. By incision.</p> <p>c. By heat, most commonly, by boring a longitudinal hole in the log, and putting one end in the fire; the resin melts, and exudes at the other end.</p> <p>Guaiacum resin is also made by boiling the chips in salt and water. It is contained chiefly in the duramen.</p>	<p>c. Externally, brownish-green or olive-green colour, and covered with powder, at first grey, but becoming greenish by exposure to the light.</p> <p>d. Brittle, with a brilliant, shining, vitreous, and resinous fracture, reddish-brown when recent; translucent at the edges.</p> <p>e. Balsamic odour when powdered or heated.</p> <p>f. Has but little taste, but causes a peculiar burning sensation in the throat.</p> <p>g. Insoluble in water; soluble in alcohol, ether, chloroform, and alkaline solutions.</p> <p>h. Tests :—(i) Solution in rectified spirit strikes a clear blue colour when applied to the inner surface of a paring of raw potato. (ii) Paper moistened with the solution becomes blue when exposed to the fumes of nitric acid.</p> <p>i. <i>Adulterations.</i>—Coniferous resins. Guaiacum is itself used to adulterate.</p>	<p><i>Tinctura Guaiaci Ammoniata.</i> Guaiacum resin, 4 } Macerate 7 Aromatic spirit of } days, and ammonia, 20 } filter. Dose.—3 ½ to 2.</p> <hr/> <p>Contained in <i>Pilula Hydrargyri Chloridi Composita</i>.</p> <hr/> <p><i>Dose of Guaiacum.</i>—gr. 10 to 30.</p> <hr/> <p><i>Incompatibles.</i>—Mineral acids; spirit of nitrous ether.</p> <hr/> <p>ACTION.—Stimulant diaphoretic. Alterative. Intestinal irritant; may be used as a purgative. Guaiacum resin is often employed in cases of sore-throat.</p>
<p>2. ELEMI.</p> <p>Probably from CANARIUM COMMUNE.</p> <p>— N.O. AMYRIDACEÆ.</p> <p>— A concrete resinous exudation.</p>	<p>a. In masses of various sizes.</p> <p>b. Yellowish-white, but more or less transparent.</p> <p>c. Soft and unctuous; but becomes harder and more resinous by age.</p> <p>d. Rather fragrant, fennel-like odour, due to volatile oil.</p> <p>e. Bitter and aromatic taste.</p> <p>f. Almost entirely soluble in rectified spirit.</p>	<p><i>Unguentum Elemi.</i> Elemi, 1 } Melt, strain, Simple ointment, 4 } and stir till cold.</p> <hr/> <p>ACTION.—External stimulant. Not used internally.</p>

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
3. MASTICHE —MASTICH. — PISTACIA LENTISCUS. — N.O. ANACARDIACEÆ. <i>A resinous exuda-</i> <i>tion obtained by</i> <i>incision from</i> <i>the stem.</i>	<i>a. Should be in small,</i> <i>roundish, or flattened</i> <i>tears.</i> <i>b. Light yellow, but</i> <i>often covered with a</i> <i>whitish dust.</i> <i>c. Friable, with a shin-</i> <i>ing, vitreous, and</i> <i>transparent fracture.</i> <i>d. Soft and ductile</i> <i>when chewed.</i> <i>e. Fragrant, agreeable</i> <i>odour.</i> <i>f. Mild, aromatic taste.</i> <i>g. Soluble in ether,</i> <i>chloroform, and oil</i> <i>of turpentine; § in</i> <i>alcohol; scarcely in</i> <i>fixed oils. Insoluble</i> <i>in water.</i>	<i>No official preparations.</i> <i>Dose.—gr. 20 to 40.</i> ACTION. —Stimulant. Chiefly used in pills, to divide active ingredients. Also employed as a masticatory.
4. JALAPÆ RESINA— RESIN OF JALAP. — EXOGENIA PURGA. — N.O. CONVOLVULACEÆ Prepared by di- gesting and per- colating <i>jalap</i> with <i>rectified</i> <i>spirit</i> ; adding water to the tinc- ture; distilling off the spirit; cooling the resi- due, pouring off the supernatant liquid, washing the resin with hot water, and drying it on a porcelain plate by the heat of a stove or water- bath.	<i>a. In opaque frag-</i> <i>ments.</i> <i>b. Dark-brown; trans-</i> <i>lucent at the edges.</i> <i>c. Friable, with a resin-</i> <i>ous fracture.</i> <i>d. Easily reduced to a</i> <i>pale-brown powder.</i> <i>e. Sweetish odour;</i> <i>acrid to the throat.</i> <i>f. Insoluble in water</i> <i>and oil of turpentine;</i> <i>soluble in rectified</i> <i>spirit; partially in</i> <i>ether.</i>	Jalap resin is contained in <i>Pilula</i> <i>Scammonii Composita.</i> <i>Dose.—gr. 1 to 5.</i> ACTION. —Strongly purgative.

Name. Plant. Natural Order. Nature.	Description.	[Pharmacy and Action.
<p>5. PODOPHYLLI RESINA— PODOPHYLL- LIN.</p> <p>—</p> <p>PODOPHYLLUM PELTATUM.</p> <p>—</p> <p>N.O. RANUNCULACEÆ.</p> <p>—</p> <p>Prepared from <i>podophyllum root</i>, by exhausting it by percolation with <i>rectified spirit</i>; distilling off the greater part of the spirit; pouring the re- mains into water, acidulated with hydrochloric acid, constantly stir- ring; and after standing to depo- sit, washing and drying the resin.</p>	<p><i>a.</i> An amorphous pow- der.</p> <p><i>b.</i> Of pale greenish- brown colour.</p> <p><i>c.</i> Soluble in rectified spirit; ammonia; and almost entirely in pure ether.</p> <p><i>d.</i> Precipitated from its solution in spirit by adding water.</p>	<p>No <i>officinal preparations</i>. <i>Dose.</i>—gr. $\frac{1}{4}$ to $\frac{1}{2}$.</p> <p>ACTION.—Drastic purgative. Hepatic stimulant.</p>
<p>6. RESINA— RESIN.</p> <p>—</p> <p>PINUS and ABIES. (Various species).</p> <p>—</p> <p>N.O. CONIFERÆ.</p> <p>—</p> <p>The <i>residue</i> left after the distil- lation of <i>Turpen- tine</i>.</p>	<p><i>a.</i> In irregular masses, of various sizes.</p> <p><i>b.</i> Translucent; yel- lowish.</p> <p><i>c.</i> Brittle and pulver- izable; the fracture is shining.</p> <p><i>d.</i> Odour and taste faintly terebinthi- nate.</p> <p><i>e.</i> Melts and burns, with much smoke.</p>	<p><i>Emplastrum Resinæ.</i> Resin, $\frac{3}{4}$ Lead plaster, lb 2 Hard soap, $\frac{3}{2}$ } Melt, and mix.</p> <p><i>Unguentum Resinæ.</i> Resin, 8 Yellow wax, 4 Simple ointment, 16 } Melt, and strain.</p> <p>ACTION.—External stimulant.</p>

Name. Plant. Natural Order. Name.	Description.	Pharmacy and Action.
7. SCAMMONIÆ RESINA— SCAMMONY RESIN.	a. In irregular pieces. b. Brownish and translucent. c. Brittle, with a resinous fracture. d. Does not form alone an emulsion with water.	<i>Mistura Scammonii.</i> Resin of scammony, } Triturate gr. 4 } to form an Milk, $\frac{3}{2}$ } emulsion. Dose.— $\frac{3}{4}$ to 2.
CONVOLVULUS SCAMMONIA. — N.O.	e. Odour, sweet and fragrant.	<i>Pilula Scammonii Composita.</i> Resin of scammony, 1 } Dissolve Resin of jalap, 1 } with gentle Soap, 1 } heat, and Strong tincture of } evaporate ginger, 1 } by water- bath.
CONVOLVULACEÆ — Prepared from scammony root, by digestion and percolation with rectified spirit; cooling; washing the resin with hot water and drying. Also pressed from scammony.	f. Entirely soluble in ether. g. The tincture does not render the fresh-cut surface of a potato blue = (absence of guaiacum).	Rectified spirit, 2 } Dose.—gr. 5 to 15. ACTION.—Drastic purgative.

C. GUM-RESINS.

Gum-resins are characterized by forming an emulsion when mixed with water, the resin being suspended by the gum. Most of them contain a small proportion of a *volatile oil*, as well as salts.

1. AMMONIACUM. — DOREMA AMMONIACUM. — N.O. UMBELLIFERÆ.	a. In small tears, or amygdaloid masses of tears. b. Pale-brown externally; white, shining, and opaque when recently fractured, but becomes yellow on exposure.	<i>Mistura Ammoniaci.</i> Ammoniacum, $\frac{1}{2}$ } Rub with the Water, 8 } water, gradually added; strain. Dose.— $\frac{3}{4}$ to 1.
An exudation from the stem and pedicels, by the puncture of a beetle; or from the root, by inci- sion.	c. Brittle when cold; softens readily with heat. d. Slight, but peculiar odour. e. Taste bitter, and rather acrid.	<i>Emplastrum Ammoniaci cum Hydrargyro.</i> (See MERCURY). Contained in :— Emplastrum Galbani. Pilula Scillæ Composita. Pilula Ipecacuanhæ cum Scilla.
		ACTION.—Antispasmodic. Expectorant. Stimulant.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
<p>2.</p> <p>ASSAFÆTIDA.</p> <p>—</p> <p>NARTHÆX ASSAFÆTIDA.</p> <p>—</p> <p>N.O. UMBELLIFERÆ.</p> <p>—</p> <p>The exudation from the incised living root.</p>	<p><i>a.</i> In tears, generally amalgamated into masses; presenting a variable degree of moistness.</p> <p><i>b.</i> A section presents differences in colour and consistence; consisting of tears, firm and whitish; and a softer, brownish-red, uniting substance.</p> <p><i>c.</i> Changes colour to pink and dark-red on exposure.</p> <p><i>d.</i> Odour strong; and alliaceous.</p> <p><i>e.</i> Taste bitter, and rather acrid.</p> <p><i>f.</i> Almost entirely soluble in alcohol.</p>	<p><i>Enema Assafætida.</i> Assafætida, gr. 30 } Rub into an Water, 3 4 } emulsion.</p> <p><i>Pilula Assafætida Composita.</i> Assafætida, 2 } Galbanum, 2 } Melt in a water- Myrrh, 2 } bath. Treacle, 1 } <i>Dose.</i>—gr. 5 to 10.</p> <p><i>Tinctura Assafætida.</i> Assafætida, 1 } Macerate 7 Rectified spirit, 8 } days; strain; filter; and make up 8. <i>Dose.</i>—3 ½ to 1.</p> <p>Assafætida is contained in :— Pilula Aloes et Assafætida. Spiritus Ammonia Fœtidus.</p> <p>ACTION.—Antispasmodic. Stimulant. Expectorant. Laxative. Emmenagogue.</p>
<p>3. GALBANUM</p> <p>—</p> <p>Probably from FERULA GALBANIFLUA OR RUBRICAULIS.</p> <p>—</p> <p>N.O. UMBELLIFERÆ.</p> <p>—</p> <p>Probably obtained by cutting the stick a little above the root, and allowing the juice which exudes to solidify.</p>	<p><i>a.</i> Usually in masses of agglutinated tears; sometimes in very small tears.</p> <p><i>b.</i> Greenish-yellow colour, and translucent; lighter than assafætida.</p> <p><i>c.</i> Firmer than assafætida.</p> <p><i>d.</i> Slighter odour than assafætida, and less unpleasant.</p> <p><i>e.</i> Bitter and acrid taste.</p>	<p><i>Emplastrum Galbani.</i> Melt and { Galbanum, 1 strain { Ammoniacum, 1. Melt and { Yellow wax, 1 add { Lead plaster, 8.</p> <p>Galbanum is contained in <i>Pilula Assafætida Composita.</i></p> <p>ACTION.— External absorbent. Antispasmodic. Stimulant. Expectorant.</p>

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
5. CAMBOGIA —GAMBOGE. GARCINIA MORELLA. N.O. GUTTIFERÆ. Obtained by making incisions into the stem; or cutting away some of the bark, and scraping away the juice that exudes; it is collected in bamboo reeds.	a. In pipes or cylinders, streaked externally. b. $\frac{1}{2}$ to $1\frac{1}{2}$ inch or more in diameter. c. Of a tawny yellow colour. d. Hard, but brittle, and easily pulverised. e. Fracture smooth, conchoidal, glistening. f. Powder is bright-yellow. g. No odour, but the powder is very irritating. h. Taste slight at first, then acrid. i. Forms a yellow emulsion with water. Soluble in rectified spirit; and most of it in ether. j. Adulterations:— Starch or flour; the emulsion with boiling water becomes green.	<i>Pilula Cambogia Composita.</i> Gamboge, 1 Barbadoes aloes, 1 Compound powder of cinnamon, 1 Hard soap, 2 Syrup, q.s. <i>Dose.</i> —gr. 5 to 10. <div style="display: flex; align-items: center; margin-top: 10px;"> <div style="font-size: 3em; margin-right: 10px;">}</div> <div> Mix. </div> </div> ACTION. —Drastic purgative. Anthelmintic. Diuretic.
6. MYRRHA— MYRRH. BALSAMODENDRON MYRRHA. N.O. AMYRIDACEÆ. An exudation from the stem.	a. In irregular tears or masses, of variable size. b. Reddish-yellow or reddish-brown, but often covered with white powder. c. Translucent. d. Fractured surface is irregular, and somewhat oily. e. Odour peculiar and aromatic. f. Taste pungent, warm, acrid, and bitter. g. Partially soluble in water; more in alcohol and ether.	<i>Tinctura Myrrha.</i> Myrrh, 1 Rectified spirit, 8 } Macerate and percolate. <i>Dose.</i> —3 $\frac{1}{2}$ to 1. Myrrh is contained in:— Decoctum Aloes Compositum. Mistura Ferri Composita. Pilula Aloes et Myrrhæ. Pilula Assafœtidæ Composita. Pilula Rhei Composita. ACTION. —Stimulant. Antispasmodic. Emmenagogue. Local stimulant.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
7. SCAMMONIUM— SCAMMONY. — CONVOLVULUS SCAMMONIA. — N.O. CONVOLVULACEÆ — Obtained by incision from the <i>living root</i> . The juice is collected in shells, and allowed to con- crete.	<p>a. In irregular masses, of variable size.</p> <p>b. Blackish-green, but covered with a fine grey powder. Rough and porous externally.</p> <p>c. Brittle, and easily powdered.</p> <p>d. Fracture resinous, shining, black.</p> <p>e. Powder is dirty grey.</p> <p>f. Musty and cheesy odour.</p> <p>g. Taste nauseous, and causes a slight prickly sensation in throat.</p> <p>h. <i>Adulterations</i> :— Chalk and starch.</p>	<p><i>Confectio Scammonii</i>. Scammony, 3 3 Ginger, 3 1½ Oil of caraway, 3 1 Oil of cloves, 3 ½ Syrup, 3 3 Clarified honey, 3 1½ Dose.—gr. 10 to 30.</p> <p><i>Pulvis Scammonii Compositus</i>. Scammony, 4 Jalap, 3 Ginger, 1 Dose.—gr. 10 to 20.</p> <p>ACTION.—Drastic purgative. Anthelmintic.</p>

D. BALSAMS OR BALSAMIC RESINS.

These are drugs which consist of a *resin* with either *benzoic* or *cinnamic acid*, which is sublimed by heat.

1. BALSAMUM PERUVIANUM —BALSAM OF PERU. — MYROXYLON PEREIRÆ. — N.O. LEGUMINOSÆ. — An exudation from the <i>trunk of the tree</i> , after the bark has been scorched and removed.	<p>a. A thick, viscid, treacle-like liquid.</p> <p>b. Reddish-brown or nearly black; opaque; translucent in thin layers.</p> <p>c. Peculiar fragrant, balsamic odour.</p> <p>d. Acrid, slightly bitter, aromatic taste.</p> <p>e. Soluble in an equal part of rectified spirit. Insoluble in water.</p> <p>f. <i>Adulterations</i> = Fixed oil; castor oil; copaiba.</p>	<p>No official preparations. Dose.—℥ 10 to 15.</p> <p>ACTION.—Externally, antiseptic and stimulant; applied to ulcers. Internally, stimulant expectorant; stimulant; acts on urinary mucous membrane.</p>
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Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
2. BALSAMUM TOLUTANUM —BALSAM OF TOLU. — MYROXYLON TOLUIFERA. — N.O. LEGUMINOSÆ. — An exudation from the <i>trunk</i> of the tree, after in- cisions have been made in the bark.	a. A soft solid, becom- ing firmer with age. b. Reddish-brown or brownish colour. c. More or less trans- parent. d. Aromatic balsamic odour. e. Aromatic taste. f. Soluble in rectified spirit and ether.	<i>Syrupus Tolutanus.</i> Balsam of tolu, 1½ } Boil the bal- Sugar, 32 } sam in water; Water, 20 } cool; filter; and dissolve the sugar. <i>Dose.</i> —3 i to 2. <i>Tinctura Tolutana.</i> Balsam of tolu, 1 } Dissolve and Rectified spirit, 8 } filter. <i>Dose.</i> —m 15 to 30. ACTION. —Similar to balsam of Peru.
3. BENZOINUM —BENZON. — STYRAX BENZON. — N.O. STYRACACEÆ. — An exudation from incisions made in the bark.	a. Usually in masses of agglutinated tears; sometimes a compact mass of resin with more or less tears in it. b. Tears are reddish- white; intervening substance is rich brown. c. Pleasant odour; but little taste. d. Tears are soluble in rectified spirit and solution of potash.	Benzoin is the source of <i>benzoic acid.</i> <i>Tinctura Benzoini Composita.</i> (Friars' Balsam). Benzoin, 8 Storax, 6 Balsam of tolu, 2 } Macerate 7 Socotrine aloes, 2 } days; filter; nearly 1½ } make up to Rectified spirit, 80 } 80. <i>Dose.</i> —3 ½ to 1. Contained in <i>Adeps Benzoatus.</i> ACTION. —Externally styptic; stim- ulant; antiseptic. Internally, stimulant expectorant; diure- tic; acts on urinary mucous membrane.
4. STYRAX PRÆPARATUS —PREPARED STORAX. — LIQUIDAMBAR ORIENTALE. — N.O. LIQUIDAM- BARACEÆ. — A balsam pre- pared from the bark; purified by means of rectified spirit, and strain- ing.	a. A liquid, of the con- sistence of bird-lime. (A solid form is non- official). b. Of brown colour; almost opaque. c. Aromatic odour. d. Soluble in alcohol and ether.	No official preparations. Contained in <i>Tinctura Benzoini Composita.</i> <i>Dose.</i> —gr. 10 to 20. ACTION. —Stimulant. Expecto- rant. Acts on urethral mucous membrane.

E. TURPENTINES OR OLEO-RESINS.

These are drugs which consist of a *volatile oil* and a *resin*; the oil can be obtained by heating the oleo-resin, the resin being left behind.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
1. COPAIBA—COPAIVA. — COPAIFERA MULTIJUGA. — N.O. LEGUMINOSÆ. — The oleo-resin obtained by incision from the trunk of the tree.	a. A viscid fluid, about the consistence of honey. b. Pale-yellow to golden or brown colour; transparent; not fluorescent. c. Peculiar aromatic odour. d. Nauseous, bitter, acrid taste. e. Insoluble in water; soluble in an equal volume of benzol, in alcohol, ether, fixed and volatile oils. f. Does not gelatinize at 270°.	<i>Oleum Copaibæ</i> , (See OILS). Dose.—℥ 20 to 60. <hr/> ACTION. —Diuretic. Has a specific action on the urinary mucous membrane, especially the urethra. Stimulant expectorant.
2. TEREBINTHINA CANADENSIS—CANADA BALSAM. — ABIES BALSAMEA. — N.O. CONIFERÆ. — The oleo-resin obtained by incision from the stem.	a. A liquid of the consistence of thin honey. b. Pale straw colour. c. Dries very slowly into a transparent, adhesive varnish. d. Peculiar agreeable odour. e. Slightly bitter, feebly acrid taste.	Canada balsam is contained in:— Charta Epispastica. Collodium Flexile. <hr/> ACTION. — External stimulant. Chiefly used for pharmaceutical purposes.

Name. Plant. Natural Order. Nature.	Description.	Pharmacy and Action.
<p>3. THUS AMERICANUM —COMMON FRANKINCENSE. — PINUS TÆDA and PALUSTRIS. — N.O. CONIFERÆ. — A concrete turpentine from the bark.</p>	<p>a. A softish solid. b. Bright-yellow; opaque. c. Resinous, but tough. d. Possesses the odour of turpentine.</p>	<p>Contained in <i>Emplastrum Picis</i>. ACTION.— External stimulant. Used mainly to give consistence to plasters.</p>

GROUP XIV.—VEGETABLE OILS AND THEIR PRODUCTS.

The *official oils* derived from the vegetable kingdom may be divided into four groups, and it will also be convenient to discuss here certain products obtained from oils, as follows :—

1. **Simple fixed oils.**
2. **Ordinary volatile oils.**
3. **Concrete oils.**
4. **Special oils, fixed and volatile.**
5. **Glycerine.**
6. **Soaps.**

I. SIMPLE FIXED OILS.

SOURCE AND PREPARATION.—The oils belonging to this group are all obtained by *pressure* from certain parts of plants, and they include the following :—

1. **Oleum Amygdalæ**—**Almond oil**—from the bitter and sweet almond, which are the *seeds* of *Amygdala Amara* and *Dulcis*. *N.O. Rosaceæ*.

2. **Oleum Lini**—**Linseed oil**—from the *seeds* of *Linum Usitatissimum*. *N.O. Linaceæ*.

3. **Oleum Olivæ**—**Olive oil**—from the *ripe fruit* of *Olea Europæa*. *N.O. Oleaceæ*.

CHARACTERS AND PROPERTIES.—1. The members of this group are liquids of an oily consistence, linseed oil being rather viscid.

2. Their colour is more or less yellow, linseed oil being the darkest.

3. Their odour is faint, but peculiar; almond oil is almost inodorous. Taste bland and oleaginous.

4. They are insoluble in water; soluble in ether; only slightly soluble in alcohol. They mix with each other in all proportions.

5. They are liable to decompose by prolonged exposure to air, becoming rancid; olive oil is the most stable; linseed oil is a “drying” oil, becoming solid after prolonged exposure.

COMPOSITION.—The oils consist of compounds of certain acids with glyceryl, and the composition of the several oils may be thus stated:—

Almond oil—Chiefly *Glyceric oleate* or *Olein*.

Linseed oil { *Glyceric Lin-oleate*.
 { *Glycerine Margarate* or *Margarin*.

Olive oil { *Olein* = 72 per cent.
 { *Margarin* = 28 per cent.

PHARMACY.—There are no named *official preparations* of the simple fixed oils.

Almond oil is { *Unguentum Cetacei*.
 contained in { „ *Simplex*.

It is used because it makes a white ointment.

Olive oil is contained in	{	Cataplasma Lini.
		Enema Magnesia Sulphatis.
		Linimentum Ammoniaë.
		„ Calcis.
		„ Camphoræ.
		Several Emplastra and Unguenta.

Almond oil is the solvent in *Oleum Phosphoratum*.

ACTION.—Externally, emollient and protective. Internally, almond and olive oils are nutrient and emollient; olive oil is laxative.

2. ORDINARY VOLATILE OILS.

SOURCE AND PREPARATION.—The volatile oils belonging to this class are all obtained by *distilling* certain parts of plants with water, and collecting the oil; one, however,—*Oleum Limonis*—may also be prepared by *expression*. Those which are recognised in the B.P. are as follows:—

1. Volatile oils from Umbelliferous fruits.

- a. *Oleum Anethi*—Oil of Dill. From *Anethum graveolens*.
- b. *Oleum Anisi*—Oil of Anise. From *Pimpinella Anisum*. (Also from the fruit of *Illicium Anisatum* or *Star Anise*. **N.O. Magnoliaceæ**).
- c. *Oleum Carui*—Oil of Caraway. From *Carum Carui*.
- d. *Oleum Coriandri*—Oil of Coriander. From *Coriandrum Sativum*.

2. Volatile oils from N.O. Labiatæ.

- a. *Oleum Lavandulæ*—Oil of Lavender. From the flowers of *Lavandula vera*. (Also Oil of *Spike*, from French Lavender).

- b. Oleum Menthae Piperitæ*—Oil of Peppermint. From the flowering plant—*Mentha Piperita*.
- c. Oleum Menthae Viridis*—Oil of Spearmint. From the fresh herb—*Mentha Viridis*.
- d. Oleum Rosmarini*—Oil of Rosemary. From the flowering-tops of *Rosmarinus Officinalis*.
- 3. **Volatile oils from N.O. Myrtaceæ.**
 - d. Oleum Cajuputi*—Oil of Cajeput. From the leaves of *Melaleuca minor*.
 - b. Oleum Caryophylli*—Oil of Cloves. From cloves, which are the unexpanded dried flower-buds of *Caryophyllus Aromaticus*.
 - c. Oleum Pimentæ*—Oil of Pimento. From the unripe berries of *Eugenia Pimenta*.
- 4. **Volatile oils from various Sources.**
 - a. Oleum Anthemidis*—Oil of Chamomile. From the flowers of *Anthemis Nobilis*. **N.O. Compositæ.**
 - b. Oleum Cinnamomi*—Oil of Cinnamon. From the inner bark of *Cinnamomum Zeylanicum*. **N.O. Lauraceæ.**
 - c. Oleum Limonis*—Oil of Lemon. Distilled or expressed from the fresh peel of the fruit of *Citris Limonis*. **N.O. Aurantiaceæ.**
 - d. Oleum Myristicæ*—Oil of Nutmeg. From nutmeg, the kernel of the seed of *Myristica Officinalis*. **N.O. Myristicaceæ.**

CHARACTERS AND PROPERTIES.—1. All the oils in this division are either colourless, or more or less yellow or brownish, except *Oleum Cajuputi*, which is of a pale bluish-green colour.

2. Each oil has a powerful and peculiar odour and taste, the latter being also warm and aromatic.

3. They are slightly soluble in water; completely in alcohol and fixed oils.

4. They can be distilled without decomposition.

COMPOSITION.—It is unnecessary to learn the exact composition of the several volatile oils, and it will be sufficient to remember that they consist of certain *hydrocarbons*, usually mixed more or less with *oxygenated derivatives*, or the latter may be alone present. In some cases one of the constituents is regarded as an *alcohol*.

PHARMACY.—1. *Officinal preparations.*—There are three classes of pharmaceutical preparations in which volatile oils are specially contained, and these must be separately considered.

A. AQUÆ.—As already mentioned, there is a class of *aquæ* or *waters* which contain volatile oils, being prepared either by distilling some part of the plant, or a volatile oil itself, with water. It will be convenient to give a complete list here of these preparations, and to indicate how they are made, although in several instances the volatile oils are not recognised officinally as separate drugs.

a. Aquæ prepared from Umbelliferous fruits.

- | | | |
|-------------------------|--------------------|--------------|
| (i) <i>Aqua Anethi</i> | } Bruised fruit, 1 | } Distil 10. |
| (ii) „ <i>Carui</i> | | |
| (iii) „ <i>Fœniculi</i> | | |

b. Aquæ prepared from Volatile oils.

- | | | |
|---------------------------------|----------------------|----------|
| (i) <i>Aqua Menthæ Piperitæ</i> | } Volatile oil, 3 1½ | } Distil |
| (ii) „ „ <i>Viridis</i> | | |

c. Aquæ prepared from Flowers.

- (i) *Aqua Floris Aurantii*—Orange flower water.
- | | | |
|--------------------|-----------------|-------------|
| (ii) „ <i>Rosæ</i> | } Fresh cabbage | } Distil 1. |
| | | |
| | Water, 2 | |
- | | | |
|------------------------|---------------|-------------|
| (iii) „ <i>Sambuci</i> | } Fresh elder | } Distil 1. |
| | | |
| | Water, 2 | |

Oleum Coriandri in *Syrupus Sennæ*.

Oleum Lavandulæ in *Linimentum Camphoræ Compositum*.

Oleum Limonis in $\left\{ \begin{array}{l} \text{Linimentum Potassii Iodidi cum} \\ \text{Sapone.} \\ \text{Spiritus Ammoniac Aromaticus.} \end{array} \right.$

Oleum Menthæ Piperitæ in *Pilula Rhei Composita*.

Oleum Myristicæ in $\left\{ \begin{array}{l} \text{Pilula Aloes Socotrinæ.} \\ \text{Spiritus Ammoniac Aromaticus.} \end{array} \right.$

Oleum Rosmarini in *Linimentum Saponis*.

ACTION.—All the volatile oils in this group have similar actions, namely:—Externally, stimulant or rubefacient. Internally, carminative; aromatic; antispasmodic. Many of them are chiefly used as flavouring agents.

Dose—of Oils, $\text{m}1$ to 4; of *Aquæ*, $\frac{3}{4}$ 1 to 2; of *Spiritus*, $\text{m}20$ to 60 or 100; of *Essentiæ*, $\text{m}10$ to 20.

3. CONCRETE OILS.

The oils belonging to this division are three in number, and require to be considered individually.

A. Camphora—Camphor. The *concrete volatile oil* obtained from the wood of *Camphora Officinarum*, **N.O. Lauracæ.** Composition = $\text{C}_{10}\text{H}_{16}\text{O}$.

PREPARATION.—The chips are boiled in water, and the camphor is collected as it sublimes. This *crude camphor*, which is imported in dirty white crystalline grains or granular masses, is purified in this country by mixing it with quick-lime, and re-subliming into glass vessels, where it collects in bell-shaped masses, which are then broken up.

CHARACTERS AND PROPERTIES.—Camphor presents the following characters and properties:—

- a. It occurs in hemispherical cakes or fragments, about 3 inches in diameter.

- b.* It is white and translucent ; and of crystalline texture.
- c.* It is tough, and difficult to powder, unless a little rectified spirit is added.
- d.* It floats on water ; Sp. gr., 0·986 to 0·996.
- e.* Has a powerful, characteristic, penetrating odour.
- f.* The taste is pungent, followed by a sensation of coldness.
- g.* Camphor volatilizes slowly at ordinary temperatures, and crystallizes on the interior of the containing vessel ; it melts, boils, and sublimes with heat.
- h.* It is soluble in water (1 in 900) ; in milk ; in rectified spirit (1 in $1\frac{1}{4}$) ; freely in ether, chloroform, volatile and fixed oils, and acetic acid. Insoluble in alkalies. When camphor is rubbed with carbolic acid crystals (3 to 1), or with hydrate of chloral (3 to 3), liquids are formed.

PHARMACY.—1. *Officinal Preparations.*—

a. Aqua Camphoræ.

Camphor, $3\frac{1}{2}$ } Digest 2 days, enclosing the
Water, C 1 } camphor in a muslin bag.

Dose— $\frac{3}{4}$ 1 to 2.

b. Linimentum Camphoræ.

Camphor, 1 }
Olive oil, 4 } Dissolve.

c. Linimentum Camphoræ Compositum.

Camphor, 5
Oil of lavender, $\frac{1}{4}$
Strong solution of ammonia, 10
Rectified spirit, 30 } Dissolve the oil and camphor in the spirit, and add the ammonia gradually, shaking them together.

CHARACTERS AND PROPERTIES:—

- a.* Oil of theobroma is a soft solid, of the consistence of tallow.
- b.* It occurs in cakes, of a yellowish colour, with a clean fracture.
- c.* It has a pleasant odour, resembling chocolate.
- d.* The taste is bland and agreeable.
- e.* It softens at the temperature of the body; and melts at about 122°.
- f.* It does not become rancid on exposure.

PHARMACY.—Cacao butter is used in the preparation of the *Suppositories*.

ACTION.—External emollient. Internally, nutritive; recommended as a substitute for cod-liver oil.

4. SPECIAL OILS.

Several important drugs belong to this group, and each demands separate consideration. It will be well to enumerate them at the outset, in the order in which they will be discussed:—

Special	{	<i>Oleum Ricini</i> —Castor oil.
Fixed oils		„ <i>Crotonis</i> —Croton oil.
Special	{	<i>Oleum Copaibæ</i> —Oil of Copaiva.
		„ <i>Cubebæ</i> —Oil of Cubebs.
		„ <i>Jumperi</i> —Oil of Juniper.
		„ <i>Rutæ</i> —Oil of Rue.
		„ <i>Sabinæ</i> —Oil of Savin.
		„ <i>Sinapis</i> —Oil of Mustard.
Volatile oils		„ <i>Terebinthinæ</i> —Oil of Turpentine.

A. *Oleum Ricini*—Castor Oil.—The oil expressed from the seeds of *Ricinus Communis*, either without (*cold-drawn*) or with the aid of heat, or

sometimes with alcohol. *N.O.* **Euphorbiaceæ.** The seeds yield about 25 to 30 per cent. of oil. It is composed mainly of *ricinic*, *ricin-oleic*, and *ricin-stearic* acids, combined with glycerine; with some acrid resinous matter.

CHARACTERS AND PROPERTIES.—*a.* A thick and viscid oil; sp. gr., 0·96.

b. Colourless or of pale-straw colour.

c. Has a peculiar, slightly nauseous odour.

d. Disagreeable, somewhat acrid taste.

e. Soluble in rectified spirit (1 in 2); in absolute alcohol (1 in 1).

f. It thickens and congeals on exposure, and becomes rancid.

PHARMACY.—*Castor oil* is contained in:—

Collodium Flexile.

Linimentum Sinapis Compositum.

Pilula Hydrargyri Subchloridi Composita.

ACTION.—Aperient.

Dose— $\frac{3}{4}$ to 1 for an adult; 3 i to 3 for children or persons who are weak.

B. Oleum Crotonis—**Croton Oil**.—The oil expressed from the seeds of *Croton Tiglium*. *N.O.* **Euphorbiaceæ.** The kernels of the seeds yield about 50 to 60 per cent. of oil. It consists of an active fixed oil; and a volatile oily liquid—*crotonic acid*.

CHARACTERS AND PROPERTIES.—*a.* A rather viscid oil; sp. gr., 0·940 to 0·950.

b. Of brownish-yellow colour.

c. Odour faintly nauseous; taste acrid.

d. Soluble in ether, olive oil, and turpentine; to various degrees in alcohol.

PHARMACY.—*Official Preparation*:—

<i>Linimentum Crotonis</i>	<table border="0"> <tr> <td>{</td> <td>Croton oil, 1</td> <td rowspan="3">} Mix.</td> </tr> <tr> <td></td> <td>Oil of Cajeput, $3\frac{1}{2}$</td> </tr> <tr> <td></td> <td>Rectified spirit, $3\frac{1}{2}$</td> </tr> </table>	{	Croton oil, 1	} Mix.		Oil of Cajeput, $3\frac{1}{2}$		Rectified spirit, $3\frac{1}{2}$
{	Croton oil, 1	} Mix.						
	Oil of Cajeput, $3\frac{1}{2}$							
	Rectified spirit, $3\frac{1}{2}$							

ACTION.—Pustulant. Drastic purgative.

C. The *special volatile oils* are all obtained by *distillation*, and the principal facts relating to the several oils may be readily summarized. Each has a peculiar and characteristic odour and taste.

1. **Oleum Copaibæ—Oil of Copaiba.** *N.O. Leguminosæ.* From the oleo-resin—*Copaiba* = about 40 per cent. Colourless or pale-yellow.

ACTION.—Like *Copaiba*. Dose.— $\text{m}5$ to 20.

2. **Oleum Cubebæ—Oil of Cubebs.** Distilled in Britain from *Cubebs*, the *unripe fruit*. *N.O. Piperacæ.* Faintly green.

ACTION.—Like *Cubebs*. Dose.— $\text{m}5$ to 20.

3. **Oleum Juniperi—Oil of Juniper.** Distilled in Britain from the *unripe fruit* of *Juniperus Communis*. *N.O. Coniferæ.*

PHARMACY.—*Officinal Preparation* :—

<i>Spiritus Juniperi</i>	{ Oil of juniper, 1 Rectified spirit, 49 }	Mix.
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ACTION.—Stimulant. Carminative. Diuretic. Dose.— $\text{m}1$ to 3; of *Spirit*, $\text{m}30$ to 60.

4. **Oleum Rutæ—Oil of Rue.** Distilled from the fresh herb of *Ruta Graveolens*. *N.O. Rutacæ.* Pale-straw colour.

ACTION.—Externally, stimulant and rubefacient. Internally, stimulant; antispasmodic; emmenagogue; and oxytotic. Dose.— $\text{m}2$ to 6.

5. **Oleum Sabinæ—Oil of Savin.** Distilled in Britain from fresh *Savin tops*—*Juniperus Sabina*. *N.O. Coniferæ.* Pale straw colour.

ACTION. Stimulant. Emmenagogue. Oxytotic.

6. **Oleum Sinapis—Oil of Mustard.** Distilled with water from the *Black Mustard-seeds*—*Sinapis Nigra*, after expressing the fixed oil. *N.O. Cruciferæ.* A product of the action of *myrosine* on *myronate of potash*; and consists of *sulphocyanide of allyl*. Yellow; has a powerful pungent odour.

Soluble in water (1 in 50); readily in rectified spirit and ether.

PHARMACY.—Oil of mustard is contained in *Linimentum Sinapis Compositum*.

ACTION.—Powerful vesicant, rubefacient or stimulant when diluted.

7. **Oleum Terebinthinæ**—Oil or Spirit of Turpentine. Distilled from the *Turpentine* or *Oleo-resin* derived from *Pinus Palustris*, *Pinaster*, and *Tæda*. *N.O. Coniferæ*.

CHARACTERS AND PROPERTIES.—*a.* Oil of turpentine is a limpid colourless liquid; sp. gr. = 0.86.

b. Possesses a strong peculiar odour.

c. Pungent and bitter taste.

d. Scarcely soluble in water; soluble in rectified spirit (1 in 10); and ether. Remains transparent with chloroform in all proportions.

e. It dissolves sulphur, phosphorus, iodine, wax, fixed oils, and resins.

f. When exposed to air, oil of turpentine partly volatilizes, partly resinifies, absorbing oxygen.

g. It is highly inflammable, burning with a yellow smoky flame.

PHARMACY.—*Officinal Preparations* :—

a. Confectio Terebinthinæ.

Oil of Turpentine, 1	} Mix.
Liquorice powder, 1	
Clarified Honey, 2	

Dose—gr. 60 to 240.

b. Enema Terebinthinæ.

Oil of Turpentine, $\frac{3}{4}$ 1	} Mix.
Mucilage of Starch, $\frac{3}{4}$ 15	

c. Linimentum Terebinthinæ.

Oil of Turpentine, 16	} Dissolve camphor in the turpentine, and mix the soap.
Camphor, 1	
Soft soap, 2	

d. Linimentum Terebinthinæ Aceticum.

Oil of Turpentine, 1	} Mix.
Acetic acid, 1	
Liniment of Camphor, 1	

e. Unguentum Terebinthinæ.

Oil of Turpentine, $\frac{3}{4}$ 1	} Melt over a water bath, and stir till cold.
Resin, gr. 60	
Yellow wax, $\frac{3}{4}$ $\frac{1}{2}$	
Prepared lard, $\frac{3}{4}$ $\frac{1}{2}$	

ACTION.—Externally, vesicant, rubefacient, or stimulant. Internally, stimulant; diuretic; anthelmintic; diaphoretic; antispasmodic; hæmostatic.

Dose.— \mathfrak{m} 10 to 30; as anthelmintic, 3 2 to 4.

5. GLYCERINUM—GLYCERINE.

Glycerine is a sweet principle, of composition $C_3H_8O_3$, obtained from fats and fixed oils. It is a triatomic alcohol, a *hydrate of glyceryl*, which is the salifiable base of oil; with about 5 per cent. of water.

PREPARATION.—Glycerine is obtained by the saponification of vegetable or animal fixed oils or fats; or by distilling them with superheated steam. It is largely made from palm-oil.

CHARACTERS AND PROPERTIES:—

- a.* A syrupy-looking liquid, oily to the touch; sp. gr. = 1.250 to 1.260.
- b.* Clear and colourless, or may be slightly yellowish.
- c.* Odourless; has a very sweet taste.
- d.* Soluble in all proportions in water and alcohol; insoluble in chloroform, ether, and oils.
- e.* At the ordinary temperature glycerine absorbs moisture from the atmosphere.

f. It is decomposed by heat, evolving intensely irritating vapours (*Acrolein*).

g. Glycerine is a solvent of iodine and iodide of sulphur; bromine; the fixed alkalies; chloride of potassium and sodium; borax freely; crystallized perchloride of iron; nitrate of bismuth; arsenious acid; carbolic acid freely; many neutral salts; vegetable acids; and many vegetable alkaloids, while it suspends others.

IMPURITIES.—Water; oils; sugar; gum or dextrin; acids.

PHARMACY.—I. *Officinal Preparations*. There is a recognized group of *Glycerina* or *Glycerines* in the B.P. (see PHARMACEUTICAL PREPARATIONS), five in number namely:—

- | | | |
|-------------------------------|---|------------|
| a. Glycerinum Acidi Carbolici | } | = 1 in 4½. |
| b. Glycerinum Acidi Gallici | | |
| c. Glycerinum Acidi Tannici | | |
| d. Glycerinum Amyli | | = 1 in 8½. |
| e. Glycerinum Boracis | | = 1 in 4½. |

2. *Glycerine* is an ingredient in:—

Linimentum Potassii Iodidi cum Sapone.

ACTION.—External and local emollient. Internally, nutrient. Used also as a flavouring agent.

Dose = 3 i to 2.

6. SAPONES—SOAPS.

There are three officinal soaps, namely:—

1. **Sapo Animalis—Curd Soap.**
2. **Sapo Durus—Hard Soap** = oleate and margarate of soda.
3. **Sapo Mollis—Soft Soap** = oleate and margarate of potash.

SOURCE AND PREPARATION.—The soaps are derived from fats and oils, by the action upon them of soda or potash, salts of these bases with the

fatty acids being thus formed. They are severally prepared as follows:—

1. *Sapo Animalis*.—Made with soda and a purified animal fat, consisting principally of stearin.
2. *Sapo Durus*.—Made with soda and olive oil.
3. *Sapo Mollis*.—Made with potash and olive oil.

CHARACTERS.—*Curd soap* is white or very light greyish; dry but horny, and pulverizable in dry warm air; easily moulded when heated. *Hard soap* has similar characters, but is greyish-white. *Soft soap* is yellowish-green; and of a gelatinous consistence. These soaps should have little or no odour.

PHARMACY.—1. *Officinal Preparations*. The named preparations of soap in the B.P. are all made with *Hard soap*, namely:—

a. *Emplastrum Cerati Saponis*.

<p>Hard soap, powdered, 10 Yellow wax, 12½ Oxide of lead, 15 Olive oil, 20 Vinegar, 160</p>	}	<p>Boil the vinegar and oxide slowly together, constantly stirring; add the soap, and evaporate by boiling; mix with the wax and oil, previously dissolved; evaporate to the consistence of plaster.</p>
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b. *Emplastrum Saponis*.

<p>Hard soap, 6 Lead plaster, 36 Resin, 1</p>	}	<p>Melt the lead plaster; add the soap and resin, liquefied; evaporate, constantly stirring.</p>
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c. *Linimentum Saponis*.

<p>Hard soap, cut small, 3 2½ Camphor, 3 1½ Oil of rosemary, 3 3 Rectified spirit, 3 18 Distilled water, 3 2</p>	}	<p>Add the ingredients to the water and spirit mixed; digest for 7 days under 70°, occasionally agitating; filter.</p>
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d. Pilula Saponis Composita. Contains *Opium*, gr. i in 6 nearly. (See *OPIUM*).

2. The other preparations in which soap is contained are:—

a. Hard Soap in *Linimentum Potassii Iodidi cum Sapone* (*Curd Soap* also used); and in several pills.

b. Linimentum Saponis in *Linimentum Opii*.

c. Soft Soap in *Linimentum Terebinthinæ*.

ACTION.—Detergent. Antacid. Laxative. Emetic.

GROUP XV.—CONCRETE JUICES AND EXTRACTS.

This group includes certain drugs which are of a more or less complex composition, and cannot be referred to any of the groups already considered. Each must be considered separately, and they may be taken in alphabetical order.

1. **Aloe—Aloes.** This is an inspissated juice from the leaf, and there are two *officinal* varieties, namely:—*a. Aloe Barbadensis*—*Barbadoes Aloes*, from the *Aloe Vulgaris*; *b. Aloe Socotrina*—*Socotrine Aloes*, from one or more undetermined species. There are several *non-officinal* varieties. *N.O. Liliaceæ.*

PREPARATION.—*Barbadoes Aloes* is obtained by merely cutting the leaves transversely, and allowing the juice to flow out, which is then evaporated to an extract. It is usually imported from Barbadoes in gourds.

Socotrine Aloes is supposed to be made by boiling the leaves. It is usually imported in skins and casks.

CHARACTERS AND PROPERTIES.—Aloes occurs in various-sized masses, and the characters of the two officinal varieties may be thus contrasted :—

BARBADOES.**SOCOTRINE.**

<i>a.</i> Yellowish or dark-brown colour; opaque.	<i>a.</i> Reddish-brown colour; opaque or translucent at edges.
<i>b.</i> Fracture dull and conchoidal.	<i>b.</i> Fracture irregular or smooth, and resinous.
<i>c.</i> Strong, disagreeable odour, especially when breathed upon.	<i>c.</i> Strong fragrant odour.
<i>d.</i> Bitter, nauseous taste.	<i>d.</i> Bitter taste.
<i>e.</i> Soluble in water (75 per cent.); almost entirely in proof spirit. (Contains a larger proportion of <i>watery extract</i>).	<i>e.</i> Soluble in water (50 per cent.); entirely in proof spirit. (Contains a smaller proportion of <i>watery extract</i> , and more <i>resin</i>).
<i>f.</i> Powder=dull olive-green.	<i>f.</i> Powder = bright orange-yellow.

PHARMACY. 1. *Officinal Preparations* :—

These are numerous and may be arranged as follows :—

A. Preparations common to both Aloes.*a. Enema Aloes = Barbadosis—Socotrina.*

Barbadoes or Socotrine aloes, gr. 40	} Mix.
Carbonate of Potash, gr. 15	
Mucilage of starch, $\frac{3}{4}$ 10	

Dose— $\frac{3}{4}$ 3 to 4.

b. Extractum Aloes = Barbadosis—Socotrina.

Barbadoes or Socotrine aloes, $\frac{3}{4}$ 10	} Thoroughly mix; allow to stand 12 hours; and evaporate to dryness.
Boiling water, C 1	

Doses { Barbadoes, gr. $\frac{1}{2}$ to 2.
Socotrine, gr. $1\frac{1}{2}$ to 3.

c. *Pilula Aloes = Barbadosis—Socotrinae.*

Barbadoes or Socotrine aloes, 2	} Mix.
Hard soap, 1	
Oil of caraway (in Barbadoes), $\frac{1}{8}$	
Oil of nutmeg (in Socotrine), $\frac{1}{8}$	
Confection of Roses, 1	

Doses { Barbadoes, gr. 4 to 5.
Socotrine, gr. 5 to 10.

B. **Special Preparation of Barbadoes Aloes.**

a. *Pilula Aloes et Ferri.*

Barbadoes aloes, 2	} Mix.
Sulphate of iron, $1\frac{1}{2}$	
Compound powder of cinnamon, 3	
Confection of roses, 4	

Dose—gr. 5 to 10.

C. **Special Preparations of Socotrine Aloes.**

a. *Decoctum Aloes Compositum.* (Baume de Vie).

Extract of Socotrine aloes, gr. 120	} Boil the solid ingredients (except saffron) gently with OI of water for five minutes; add the saffron; cool; add the tincture of cardamoms; macerate for 2 hours; strain through flannel; and pour water on the contents of the strainer to $\frac{3}{4}$ 30.
Myrrh, gr. 90	
Saffron, gr. 90	
Carbonate of potash, gr. 60	
Extract of Liquorice, $\frac{3}{4}$ 1	
Compound tincture of cardamoms, $\frac{3}{4}$ 8	
Water, a sufficiency	

Dose— $\frac{3}{4}$ $\frac{1}{2}$ to 2.

b. *Pilula Aloes et Assafœtidae.*

Socotrine aloes, 1	} Mix.
Assafœtida, 1	
Hard soap, 1	
Confection of roses, 1	

Dose—gr. 5 to 10.

c. Pilula Aloes et Myrrha.

Socotrine aloes, 2	} Mix.
Myrrh, 1	
Dried saffron, $\frac{1}{2}$	
Confection of roses, $2\frac{1}{2}$	

Dose—gr. 5 to 10.*d. Tinctura Aloes.*

Socotrine aloes, 1	} Macerate 7 days ;
Extract of Liquorice, 3	
Proof spirit, 40	
	press ; and wash
	the marc with spirit
	to 40.

Dose—3 i to 2.*e. Vinum Aloes.*

Socotrine aloes, $\frac{3}{4}$ 1 $\frac{1}{2}$	} Digest 7 days ;
Ginger, gr. 80	
Cardamom seeds, gr. 80	
Sherry wine, $\frac{3}{4}$ 40	
	strain ; and make
	up to 40.

Dose—3 i to 2.

2. The *other preparations* in which *aloes* is contained, are as follows:—

<i>Barbadoes</i>	{	Pilula Cambogia Composita.
<i>Aloes in</i>		„ Colocynthis Composita.
		„ „ et Hyoscyami.
<i>Socotrine</i>	{	Extractum Colocynthis Compositum.
<i>Aloes in</i>		Pilula Rhei Composita.
		Tinctura Benzoini Composita.

ACTION.—Stomachic tonic. Purgative, acting especially on lower bowel. Hepatic stimulant. Emmenagogue.

2. **Catechu Pallidum—Pale Catechu.**—An *extract* prepared from the leaves and young shoots of *Uncaria Gambir*. *N.O. Cinchonaceæ*. (*Catechu nigrum* or *black catechu* is obtained from *Acacia catechu*, but is *non-officinal*). Catechu consists chiefly of catechu-tannic acid and catechin, with gum, &c. It may be discussed in a tabular arrangement.

CHARACTERS.	PHARMACY. ACTION.
<p>a. Pale catechu occurs in cubes or masses of coherent cubes, about an inch in diameter.</p> <p>b. Externally, it is brown or reddish-brown; internally, yellow.</p> <p>c. Presents a porous texture; and breaks with a dull, earthy fracture.</p> <p>d. Soluble in cold water (60 per cent.); entirely in boiling water.</p> <p>e. Taste, <i>astringent</i>, bitter, and mucilaginous, followed by slight sweetness.</p> <p>f. A solution in boiling water, cooled, does not give a blue colour with iodine=absence of <i>starch</i>, which is used as an adulteration.</p>	<p><i>Infusum Catechu.</i> Catechu, gr. 160 Cinnamon, gr. 30 Boiling water, $\frac{3}{4}$ 10 } Infuse half an hour, and strain. Dose—$\frac{3}{4}$ 1 to 2.</p> <hr/> <p><i>Pulvis Catechu Compositus.</i> Catechu, 4 Kino, 2 Rhatany, 2 Cinnamon, 1 Nutmeg, 1 } Powder and mix. Dose—gr. 20 to 40.</p> <hr/> <p><i>Tinctura Catechu.</i> Catechu, 2½ Cinnamon, 1 Proof spirit, 20 } Macerate 7 days; strain, press, filter, and make up 20. Dose—$\frac{3}{4}$ 1 to 2.</p> <hr/> <p><i>Trochisci Catechu.</i> Made in the ordinary way. Each lozenge contains gr. 1. Dose—1 to 6.</p> <hr/> <p><i>Incompatibles.</i>—Alkalies; metallic salts; gelatine.</p> <hr/> <p>ACTION.—Powerful astringent.</p>

3. **Elaterium.**—A *sediment* from the *expressed juice* of the fruit *Ecbalium officinarum* or *Squirting Cucumber*. *N.O. Cucurbitaceæ*. Its active principle is *Elaterin*, which is a neutral glucoside.

PREPARATION.—Cut the nearly-ripe fruit lengthwise, and lightly press out the juice. Strain through a hair-sieve, and set it aside to deposit. Carefully pour off the supernatant liquor; drain the sediment on a linen filter; and dry it on porous tiles with a gentle heat.

CHARACTERS.—There are two recognized varieties of elaterium—English and Maltese, but the former is the better and more reliable. It has the following characters :—

- a. It occurs in small cakes or plates; flat or slightly incurved; about a line thick.
- b. It has a greenish-grey colour; and somewhat resembles vulcanized india-rubber.
- c. Elaterium is of light texture; brittle, with a finely-granular fracture.
- d. It has an acrid and bitter taste.
- e. Half dissolves in boiling rectified spirit; and this solution, concentrated and added to warm solution of potash, yields, on cooling, not less than 20 per cent. of *elaterin*.
- f. Elaterium does not effervesce with acids = absence of *chalk* as an adulteration. It is not injured by light. *Starch* is also used as an adulteration.

PHARMACY. *Official Preparation* :—

Pulvis Elaterii Compositus = 1 in 10.

Elaterium, 1	} Powder and mix intimately.
Sugar of milk, 9	

ACTION.—Hydragogue purgative.

Dose—Of *Elaterium*, gr. $\frac{1}{18}$ to $\frac{1}{2}$; of *Compound Powder*, gr. $\frac{1}{2}$ to 5.

4. **Gutta-Percha.**—The *concrete juice* of *Isonandra gutta*. *N.O. Sapotaceæ*.

CHARACTERS.—a. In tough, flexible pieces.

b. Of light-brown or chocolate colour.

c. Insoluble in water; soluble in chloroform (forming a turbid solution), ether, and bisulphide of carbon.

d. Gutta percha is soft and plastic at 212°, and can then be moulded into any shape, which it retains when cold.

PHARMACY.—*Official Preparation.*

Liquor Gutta-Percha.

Gutta-percha, 1
Carbonate of lead, 1
Chloroform, 8

} Dissolve the gutta-percha in $\frac{3}{6}$ of the chloroform;
add the carbonate of lead dissolved in the remainder; shake several times; set aside until the insoluble matter has subsided; and decant the clear liquid.

Liquor gutta-percha is used in the preparation of *Charta Sinapis*.

ACTION.—The solution is protective, a film of gutta-percha remaining after the evaporation of the chloroform. Gutta-percha is much used in surgical practice.

5. **Kino.**—The *inspissated juice* obtained from incisions made in the *trunk* of *Pterocarpus Marsupium*. **N.O. Leguminosæ.** Consists mainly of kino-tannic acid, with kino-red, gum, etc.

CHARACTERS.	PHARMACY. ACTION.
a. Kino is met with in small, angular fragments.	<i>Pulvis Kino Compositus.</i> Kino, 15 Opium, 1 Cinnamon, 14 } Powder and mix. <i>Dose.</i> —gr. 5 to 20.
b. Of reddish-black colour; glistening, ruby-red, and translucent at the edges.	<i>Tinctura Kino.</i> Kino, 1 Rectified spirit, 10 } Macerate 7 days; filter; and make up to 10. <i>Dose.</i> — $\frac{3}{4}$ to 2.
c. Brittle in texture.	Kino is an ingredient in <i>Pulvis Catechu Compositus</i> .
d. Soluble in water (about 88 per cent.); and in alcohol.	<i>Incompatibles.</i> —Mineral acids; alkalies and their carbonates metallic salts; gelatine.
e. Kino has no odour; it possesses a very astringent taste, and tinges the saliva blood-red.	ACTION.—External styptic. Astringent. <i>Dose.</i> —gr. 10 to 30.

6. **Manna.**—The *concrete saccharine exudation* obtained by incision from the *stem* of *Fraxinus Ornus* and *Rotundifolia*. *N.O. Oleaceæ*. It consists chiefly of *Mannite*, with ordinary sugar, and extractive matter, &c.

CHARACTERS AND PROPERTIES:—

- a. Manna forms stalactiform pieces, uneven, curved on one surface.
- b. From 1 to 6 inches long; 1 to 2 inches wide.
- c. Of yellowish-white colour.
- d. Porous and friable.
- e. Has a faint, nauseous odour; sweetish, but rather bitter taste.
- f. Soluble in water (1 in 5); in rectified spirit (1 in 12C).

ACTION.—Nutrient. Laxative. *Dose*—3 2 to 8.

7. **Opium.**—The *juice, inspissated by spontaneous evaporation* obtained by incision from the *unripe capsules* of the poppy—*Papaver Somniferum*. *N.O. Papaveraceæ*. Opium in a very complex substance, consisting of alkaloids, acids, neutral principles, &c. (*See PAPAVERACEÆ*).

PREPARATION.—Superficial horizontal incisions are made with a sharp instrument into the unripe capsules, a few days after the fall or the gathering of the petals, taking great care not to penetrate their interior. A milky juice exudes, and the tears are scraped from the capsules, and carefully deposited on a poppy-leaf. When a sufficient quantity has been collected, it is made into a cake or lump, wrapped in poppy-leaves, and placed for a short time to dry in the shade. It soon becomes of a brown colour.

The *non-official* varieties of opium are manipulated in various ways.

CHARACTERS.—There are several known varieties of opium, namely, Turkey, Egyptian, East Indian, Persian, and European. Only the first is *officinal*, and it includes *Smyrna* and *Constantinople Opium*, named according to the port from which it is shipped, that from Smyrna being most commonly imported into this country. Their chief characters may be thus arranged :—

SMYRNA OPIUM.

- a. Occurs in irregular lumps, more or less flattened.
- b. Weight, $\frac{1}{4}$ to 2 pounds.
- c. Is enveloped in the remains of poppy-leaves, and generally covered with the capsules of a species of rumex.
- d. When fresh it is soft and plastic; tearing with an irregular, slightly moist, rich brown surface, which shines when rubbed smooth with the finger.
- e. Has a peculiar, heavy, narcotic odour.
- f. Nauseous, bitter taste.

CONSTANTINOPLE OPIUM.

- Occurs in two forms, the one in large irregular cakes, more or less like the Smyrna opium; the other presenting the following characters :—
- a. Flattened cakes of lenticular form.
- b. Weight, $\frac{1}{4}$ to $\frac{1}{2}$ pound; 2 to 3 inches in diameter.
- c. Covered with a poppy leaf, the midrib of which crosses the middle of each piece; not covered with rumex leaves.

IMPURITIES AND ADULTERATIONS.—Opium should yield, according to the B.P., from 6 to 8 per cent. of morphia, and a *quantitative test* is introduced to determine that this amount is present. Good opium, however, yields from 10 to 12 or 15 per cent. of morphia. It is liable to have its active principles removed before it is sold; and may also contain the following adulterations :—1. Vegetable Extracts. 2. Sugar and Treacle. 3. Mechanical admixtures = sand, clay, stones, bullets, &c. 4. Water.

PHARMACY. 1. *Officinal Preparations* :—

It will be well to give a complete list of the preparations which contain opium, with the propor-

tions in each. They may be arranged in groups, thus:—

A. Preparations for External Use.

a. *Emplastrum Opii* = 1 in 10.

Opium, in fine powder, 1	} Melt the plaster by the steam- or water-bath, and gradually mix the opium.
Resin plaster, 9	

b. *Linimentum Opii* = 1 of Tincture in 2.

Tincture of opium, 1	} Mix.
Liniment of soap, 1	

c. *Unguentum Gallæ cum Opio*, 1 in 14 $\frac{2}{3}$. (See GALLS.)

B. Preparations for Internal Use.

a. *Confectio opii* = 1 in 40.

Compound powder of opium, gr. 192	} Mix.
Syrup, $\frac{3}{4}$ 1	

Dose—gr. 5 to 20.

b. *Extracta* or *Extracts*.

(i) *Extractum Opii*, gr. $\frac{1}{2}$ = gr. 1 of opium.

Opium, in slices, $\frac{3}{4}$ 16	} Made by three repeated macerations for 24 hours, in O 2 of water, and expression; mixing the liquors; straining through flannel; and evaporating by a water-bath.
Water, $\frac{3}{4}$ 120	
Dose—gr. $\frac{1}{2}$ to 1 or more.	

(ii) *Extractum Opii Liquidum*, m 22 = m 25 of Tincture.

Extract of opium, 1	} Digest the extract in the water for an hour, stirring frequently; add the spirit, and filter.
Water, 16	
Rectified spirit, 4	

Dose—m 10 to 40.

c. Pilula or Pills.(i) *Pilula Saponis Composita* = 1 in 6 nearly.

Opium, 1	} Powder and mix the
Hard soap, 4	
Water, a sufficiency.	

opium and soap; add
sufficient water to make
a pill mass.

Dose—gr. 3 to 5.(ii) *Pilula Ipecacuanhæ cum Scilla*. Made with Dover's powder = 1 of opium in 23. (See IPECACUANHA). *Dose*—gr. 5 to 10.(iii) *Pilula Plumbi cum Opio* = 1 in 8. (See PLUMBUM). *Dose*—gr. 2 to 4.*d. Pulveres or Powders.*(i) *Pulvis Cretæ Aromaticus cum Opio* = 1 in 40. (See CALCIUM). *Dose*—gr. 10 to 40.(ii) *Pulvis Ipecacuanhæ Compositus* = 1 in 10. (See IPECACUANHA). *Dose*—gr. 5 to 10.(iii) *Pulvis Kino Compositus* = 1 in 20. (See KINO). *Dose*—gr. 5 to 10.(iv) *Pulvis Opii Compositus* = 1 in 10.

Opium, 3	} Powder and mix.
Black pepper, 4	
Ginger, 10	
Caraway, 12	
Tragacanth, 1	

Dose—gr. 2 to 5.

e. Tincturæ or Tinctures.(i) *Tinctura Camphoræ Composita* = gr. 1 in $3\frac{1}{2}$. (See CAMPHOR). *Dose*—℥ 15 to 60.(ii) *Tinctura Opii* = gr. 1 in ℥ 14 $\frac{2}{3}$.

Opium, 1 $\frac{1}{2}$	} Macerate 7 days; strain,
Proof spirit, 20	

press, filter, and make up
to 20.

Dose—℥ 5 to 40.

(iii) *Tinctura Opii Ammoniata* = gr. i in ℥ 96.

Opium, gr. 100	} Macerate 7 days in a closed vessel, with occasional agitation; strain; and make up to 20.
Saffron, gr. 180	
Benzoic acid, gr. 180	
Oil of anise, ℥ 60	
Strong solution of ammonia, ℥ 4	
Rectified spirit, ℥ 16	

Dose— $3\frac{1}{2}$ to i.

f. *Trochisci Opii* = gr. $\frac{1}{10}$ of *Extract of opium* in each lozenge. Made with extract of opium, tincture of tolu, refined sugar, gum acacia, and extract of liquorice.

Dose—i to 2.

g. *Vinum Opii* = gr. i of *Extract of opium* in ℥ 22.

Extract of opium, ℥ i	} Macerate 7 days, with occasional agitation; and filter.
Cinnamon, gr. 75	
Cloves, gr. 75	
Sherry wine, ℥ 20	

Dose—℥ 10 to 40.

C. Preparations administered per rectum.

(a) *Enema Opii*.

Tincture of opium, $3\frac{1}{2}$	} Mix.
Mucilage of starch, ℥ 2	

(b) *Suppositoria Plumbi Composita* = gr. i of opium in each. (See PLUMBUM).

2. *Incompatibles*. The chief drugs chemically incompatible with opium are alkaline carbonates; lime-water; salts of lead, iron, copper, mercury, and zinc; liquor arsenicalis; and vegetable astringents. It is often given, however, in combination with some of these incompatibles.

ACTION.—Anodyne and sedative. Cerebral excitant and narcotic. Spinal excitant. Vascular stimulant, followed by sedative effects. Diminishes

all secretions and excretions, except perspiration. Diaphoretic. Pulmonary sedative. Myositic. Aphrodisiac.

Dose—Of *Opium*, gr. $\frac{1}{2}$ to 2. (*See Official Preparations*).

GROUP XVI.—ALKALOIDS.

There are certain alkaloids which are recognized in the B.P. as separate drugs, either alone or in the form of salts. These will now be considered in alphabetical order.

1. **Aconitia** = $C_{30}H_{47}NO_7$.

SOURCE AND PREPARATION.—From *Aconiti Radix*.
N.O. Ranunculaceæ.

a. Coarsely powdered aconite root is heated to ebullition with *rectified spirit*; then cooled, and macerated for 4 days; and percolated until the root is exhausted.

b. The spirit is mainly distilled off, and the remainder is evaporated.

c. The residual extract is thoroughly mixed with *boiling water*, and on cooling, this is filtered through paper. (An infusion containing *salts of aconitia* is formed).

d. *Solution of ammonia* is added to the filtered liquid in slight excess, and the mixture is gently heated over a water bath. (*Impure aconitia* is precipitated).

e. The precipitate is separated on a filter, dried, coarsely powdered, and macerated in successive portions of pure *ether*, with frequent agitation. The several products are decanted, mixed, and the ether distilled off.

f. The dry extract (almost pure aconitia) is dissolved in warm water, acidulated with *sulphuric acid*. (A solution of *sulphate of aconitia* is formed).

g. When cold, diluted *solution of ammonia* is added cautiously to precipitate the aconitia; which is washed on a filter with a small quantity of water; and dried by slight pressure between folds of filtering paper.

CHARACTERS AND PROPERTIES :—

- a.* White; usually amorphous, but may be crystalline.
- b.* Alkaline to test-paper.
- c.* Soluble in cold water (1 in 150); boiling water (1 in 50); much more in alcohol and ether.
- d.* Fusible; when burnt leaves no residue.

PHARMACY.—*Official preparation* :—

Unguentum Aconitiæ.

Aconitia, gr. 8	}	Dissolve in the spirit, and mix with the lard.
Rectified spirit, 3 ½		
Lard, 3 i		

ACTION.—A powerful poison. Only used externally as an anodyne; causes tingling and numbness.

2. **Atropia** = $C_{17}H_{23}NO_3$.

SOURCE AND PREPARATION.—From *Belladonna Radix*. *N.O. Atropaceæ*.

a. Recently dried belladonna root, coarsely powdered, is macerated in *rectified spirit* for 24 hours, with frequent stirring; and then exhausted by slow percolation. (This tincture contains *salts of atropia*, with colouring and resinous matters, &c).

b. *Slaked lime* is added, and the tincture shaken. (Colouring matters are precipitated).

c. Filter; add *diluted sulphuric acid* in feeble excess; and filter again. (The excess of lime is neutralized).

d. Three-fourths of the alcohol is distilled off, and water added to the residue, which is rapidly evaporated at a gentle heat, to one-third its volume, and then allowed to cool. (A watery solution of *salts of atropia*, resins, sulphuric acid, and calcic sulphate is formed).

e. Solution of *carbonate of potash* is added very cautiously, with constant stirring, nearly to neutralization. Set aside for 6 hours, (resin precipitated); filter; and add carbonate of potash to a decided alkaline reaction. (*Atropia* is precipitated).

f. The whole is mixed with *chloroform* in a bottle, by frequent brisk agitation, and the mixed liquids poured into a funnel furnished with a stop-cock. (The *chloroform* dissolves the *atropia*).

g. When the chloroform solution subsides, it is drawn off by the stop-cock, and the chloroform distilled off.

h. The residue of *atropia* is dissolved in warm *rectified spirit*; digested with *animal charcoal* (to decolourize it); and the solution filtered, evaporated, and cooled, until colourless crystals are obtained = *atropia*.

CHARACTERS AND PROPERTIES :—

a. *Atropia* is in colourless acicular crystals.

b. Soluble in water (1 in 500); in rectified spirit (1 in 8); in ether (1 in 20).

c. The solution in water is alkaline.

d. Has a bitter taste.

e. *Atropia* leaves no ash when burnt with free access of air.

f. It gives a citron-yellow precipitate with chloride of gold.

PHARMACY.—*Official preparations*:—

a. *Atropiæ Sulphas*. This is an important salt of atropia, made in the following way:—

Mix { Atropia, gr. 120 } ; and add diluted sulphuric acid gradually, stirring until the alkaloid is dissolved, and the solution is neutral. Evaporate to dryness under 100°.

Sulphate of atropia is a colourless powder; soluble in water; the solution is neutral.

b. *Liquor Atropiæ* = gr. 4 in 3 i.

Atropia, gr. 4 } Dissolve the atropia in
Rectified spirit, 3 i } the spirit, and add
Water, 3 i } gradually to the water.

c. *Liquor Atropiæ Sulphatis* = gr. 4 in 3 i.

Sulphate of atropia, gr. 4 } Dissolve.
Water, 3 i }

d. *Unguentum Atropiæ*.

Atropia, gr. 8 } Dissolve the atropia in
Rectified spirit, 3 ½ } the spirit, and mix
Prepared lard, 3 i } with the lard.

ACTION.—Local anodyne and sedative. Mydriatic. Checks most secretions, especially saliva, milk, and sweat. Cerebral excitant and narcotic. Respiratory stimulant and sedative. First slows and then quickens cardiac action; in large doses cardiac depressant. Contracts and then dilates vessels. Stimulates muscular coat of intestines, bladder, etc.

3. *Beberia Sulphas*—*Sulphate of Beberia* =



SOURCE AND PREPARATION.—From the bark of *Nectandra Rodiaei*, the Bebeeru tree. *N.O. Lauracææ*. There are several steps in the process of preparation as follows:—

a. Coarsely powdered *bebeeru bark*, lb i, is moistened thoroughly with much *diluted sulphuric acid*,

$3\frac{1}{2}$ in C1; allowed to macerate for 24 hours; and then percolated with the remainder of the acidulated water. (A solution of *sulphate of beberia* with colouring matters, &c., is formed.)

b. The solution is concentrated to O1; cooled; *milk of lime* gradually added, with agitation, but not sufficient to neutralize the acid; and the mixture allowed to stand for 2 hours. (Colouring matters are precipitated).

c. Filter through calico; wash the precipitate with a little cold water; and to the filtrate add *solution of ammonia* until it has a faint ammoniacal odour. (*Impure beberia* is precipitated).

d. Collect the precipitate on a cloth; wash with cold water, squeeze, and dry; pulverize; exhaust by boiling with successive portions of *rectified spirit*; and mix them together. (A solution in spirit of nearly pure *beberia*).

e. Add *water* ($3\frac{1}{4}$); distil to recover the spirit; and add by degrees, with constant stirring, *diluted sulphuric acid*, till the fluid has a slight acid reaction. (A solution of nearly pure *sulphate of beberia*).

f. Evaporate to dryness; powder; pour on it gradually cold water (O 1), stirring diligently; filter through paper; evaporate to a syrupy consistence; and dry in thin layers on porcelain or glass plates under 140° . Preserve in stoppered bottles.

CHARACTERS AND PROPERTIES:—

1. Sulphate of beberia is in thin scales.
2. Dark-brown in colour; translucent. Yellow when in powder.
3. Soluble in water and alcohol.
4. Has a strong bitter taste.

ACTION.—Bitter tonic. Antiperiodic. Antipyretic. *Dose*.—gr. 1 to 5; gr. 10 to 20 as antiperiodic.

4. **Morphia.**— $C_{17}H_{19}NO_3$.

This is the principal alkaloid present in *Opium*.
N.O. Papaveraceæ. It is recognized in the B.P. in the form of two salts, namely:—

1. *Morphiæ Hydrochloras*—*Hydrochlorate of Morphia*.— $C_{17}H_{19}NO_3, HCl, 3H_2O$.

2. *Morphiæ Acetas*—*Acetate of Morphia*.— $C_{17}H_{19}NO_3, C_2H_4O_2$.

PREPARATION.—I. The *Hydrochlorate* is the salt directly obtained from opium, and it is prepared by the following process:—

a. Macerate sliced *opium* (℥i) in successive quantities of *cold water*, subjecting it finally to strong pressure; unite the decanted liquors; evaporate to 1 pint; and strain through calico.

(A concentrated infusion of *meconates* and *sulphate of morphia* and *codeia*, with resins, extractive matters, &c.)

b. Add $\left\{ \begin{array}{l} \text{Calcic chloride, } \frac{3}{4} \\ \text{Water, } \frac{3}{4} \end{array} \right\}$, and evaporate until the solution becomes solid on cooling.

(*Hydrochlorate of morphia* and *codeia* are formed).

c. Subject the mass to powerful pressure, preserving the dark fluid which exudes. Then triturate the squeezed cake with boiling water; wash it well on a paper filter with more boiling water; evaporate the filtered liquids as before, cool, solidify, and press; and if the mass be still much coloured, repeat this process again, always preserving the expressed fluids.

(The dark liquid contains colouring matters, &c., with a small proportion of alkaloids).

d. Dissolve the pressed cake in *boiling water* ($\frac{3}{4}$); digest with *purified animal charcoal* ($\frac{3}{4}$) for 20 minutes; filter, and wash the filter and charcoal with boiling water.

(The colouring matters are thus removed).

e. Add *solution of ammonia* in slight excess. Collect the precipitate formed as the liquid cools on a paper filter, and wash with cold water until the washings cease to give a precipitate with solution of nitrate silver acidulated by nitric acid.

(*Morphia* is precipitated, *codeia* remains in solution; and the *morphia* is washed free from *codeia*).

f. Diffuse the *morphia* through boiling water ($\frac{3}{2}$) in a porcelain capsule, kept hot; add *dilute hydrochloric acid* carefully, constantly stirring, until the *morphia* is entirely dissolved, and the solution is neutral.

(A solution of pure *hydrochlorate of morphia* is obtained).

g. Cool; crystallize; drain and dry the crystals on filtering paper. More crystals may be obtained by evaporating and cooling.

h. A small quantity of *morphia* may be obtained from the dark liquids, by diluting them with water, precipitating with solution of potash in much excess; filtering; super-saturating the filtrate with hydrochloric acid; digesting with a little animal charcoal, and filtering; and adding solution of ammonia.

2. *Acetate*.—This is prepared from the hydrochlorate, by precipitating the *morphia* by *solution of ammonia*; collecting, washing, and dissolving in *dilute acetic acid*; evaporating over a water-bath until it concretes on cooling; drying at a gentle heat; and powdering.

PROPERTIES AND TESTS.—The two salts of *morphia* may be considered together.

1. *Hydrochlorate* is in flexible acicular prisms, white, with a silky lustre. *Acetate* is a white powder.

2. Soluble in water (*acetate* 1 in 6, *hydrochlorate*

1 in 20); and in rectified spirit (*acetate* 1 in 100, *hydrochlorate* 1 in 90).

3. Give a white precipitate with solution of potash, soluble in excess.

4. An orange-red colour is produced when moistened with strong nitric acid.

5. A greenish-blue colour is given with solution of perchloride of iron.

PHARMACY.—1. There are several *official preparations* containing morphia, in most cases in the form of *hydrochlorate*. They may be arranged thus in alphabetical order:—

a. *Injectio Morphiæ Hypodermica*.—A solution of *acetate of morphia* = gr. 1 in $\mathfrak{m}12$. The solution of acetate is prepared from the hydrochlorate by the process above described, and water added to the proper strength.

b. *Liquor Morphiæ* { *Acetatis.*
 Hydrochloratis.

These solutions may be considered together, as they are practically made in the same way, only the salt and acid used being different, and each contains gr. 4 in $\frac{3}{4}$ 1.

Their preparation may be thus indicated:—

Mix { Diluted acetic or hydrochloric acid, $\mathfrak{m}8$
 { Rectified spirit, 3 2
 { Water, 3 6

Dissolve { Acetate of morphia, or
 { Hydrochlorate of morphia } gr. 4

c. *Suppositoria* { *Morphiæ.*
 Morphiæ cum Sapone.

These preparations both contain the *hydrochlorate* = gr. $\frac{1}{2}$ in each.

Suppositoria Morphiæ { Benzoated lard.
 made up with { White wax.
 { Oil of theobroma.

fluid; collect the precipitate on a filter; and wash it colourless with cold water.

(*Quinia* is precipitated).

c. Heat the quinine with water (O 1), by a water-bath; and gradually add *diluted sulphuric acid*, until very nearly the whole has been dissolved, and a neutral liquid has been obtained.

(A solution of *sulphate of quinia* is produced).

d. Filter while hot; wash the filter with boiling water; evaporate; crystallize; and dry the crystals on filtering paper.

PROPERTIES AND TESTS:—

1. Sulphate of quinine is in filiform crystals, silky or feathery, snow-white.

2. It is sparingly soluble in water (1 in 1000), the solution being fluorescent, presenting a peculiar bluish tint; in rectified spirit (1 in 40); readily soluble in water acidulated with m 1 of dilute sulphuric, nitric, or phosphoric acid to each grain, (1 in 8).

3. It has an intensely and purely bitter taste.

4. Treated with chlorine water, and then with ammonia, a splendid emerald green colour is produced.

PHARMACY.—1. *Officinal Preparations*:—

a. *Pilula Quiniæ*.

Sulphate of quinia, 6	} Mix.
Confection of hips, 2	

Dose—gr. 2 to 10.

b. *Tinctura Quiniæ*.

Sulphate of quinia, gr. 160	} Dissolve with gentle heat; filter in 3 days.
Tincture of orange-peel, O 1	

Dose—3 i to 2.

c. *Tinctura Quiniæ Ammoniata.*

Sulphate of quinia, gr. 160	} Dissolve in the spirit with gen- tle heat, and add the ammonia.
Solution of ammonia, \mathfrak{z} 1½	
Proof spirit, \mathfrak{z} 17½	

Dose— \mathfrak{z} ½ to 2.d. *Vinum Quiniæ.*

Sulphate of quinia, gr. 20	} Dissolve the ci- tric acid, and then the quinia. Filter in 3 days.
Citric acid, gr. 30	
Orange-wine, O 1	

Dose— \mathfrak{z} ½ to 1.

2. *Quinine* is contained in *Ferri et Quiniæ Citras*.

ACTION.—Antiseptic. Tonic. Antipyretic. Anti-periodic. Liable to produce “quininism”. *Dose*—gr. 1 to 10, 20, or more. (*See Official Preparations*).

6. **Strychnia** = $C_{21}H_{22}N_2O_2$.

SOURCE AND PREPARATION.—From the seeds of *Strychnos Nux Vomica*. *N.O. Loganiaceæ*.

a. *Nux Vomica* seeds (℥ 1) are first steamed, sliced, dried, and ground in a coffee-mill.

b. Digest for 12 hours, at a gentle heat, with { *Rectified Spirit*, O 2 } ; strain; press; and repeat this process twice.

(A *tincture* of *strychnia* and *brucia* salts, with colouring matter, &c., is obtained).

c. Distil off the spirit; evaporate the watery residue to about \mathfrak{z} 16; and filter when cold.

d. Add a solution of *acetate of lead*, so long as it produces any precipitate; filter; and wash the precipitate with cold water (\mathfrak{z} 10), adding the washings to the filtrate.

Colouring matters, &c., are precipitated).

e. Evaporate the liquid to $\frac{3}{8}$; when cold, add *solution of ammonia* in slight excess, stirring thoroughly; allow the mixture to stand 12 hours.

(*Strychnia* and *brucia*, with other matters, are precipitated).

f. Collect the precipitate on a filter; wash with cold water; dry; boil with successive portions of *rectified spirit*, till the fluid scarcely tastes bitter; distil off most of the spirit; evaporate to about $\frac{3}{8}$; and set aside to cool.

(*Strychnia*, with a little *brucia*, crystallizes out as a white adherent crust; *brucia* remains in solution).

g. Cautiously pour off the liquid; and wash the crust on a paper filter with $\left\{ \begin{array}{l} \text{Rectified Spirit, 4} \\ \text{Water, 1} \end{array} \right\}$ till the washings do not redden with nitric acid.

(*Brucia* is thus separated).

h. Dissolve by boiling in *rectified spirit*, $\frac{3}{8}$; and set aside to crystallize.

i. More crystals may be obtained by evaporating the mother liquor.

PROPERTIES AND TESTS:—

1. *Strychnia* occurs in minute crystals=right square octahedra or 4-sided prisms; colourless.

2. It has no odour; an intensely bitter taste.

3. Very slightly soluble in cold water, (1 in 5760), but imparts to the water its bitter taste; boiling water (1 in 2500); soluble in boiling rectified spirit and chloroform; insoluble in cold alcohol, ether, and alkalies.

4. Fusible, but not volatile with heat; leaves no ash when burned with free access of air.

5. *Strychnine* is not coloured by sulphuric or nitric acid. With sulphuric acid and bichromate of potash it acquires an intensely violet hue, speedily passing through red to yellow.

PHARMACY.—*Officinal Preparation*.—

Liquor Strychniæ = gr. 4 in $\frac{3}{4}$ l.

Strychnia, gr. 4	} Dissolve the strychnia in the acid with $\frac{3}{4}$ of water by heat ; add the spirit and remainder of water.
Dilute hydrochloric acid, m 6	
Rectified spirit, 3 2	
Water, 3 6	

Dose—m 4 to 10.

ACTION.—Stomachic and general tonic. Spinal stimulant, exciting reflex activity, and ultimately causing tetanic spasms. Respiratory stimulant. Cardiac stimulant and tonic. *Dose*—gr. $\frac{1}{30}$, gradually increased.

7. **Veratria** = $C_{32}H_{52}N_2O_8$ (not quite pure).

SOURCE AND PREPARATION.—From Cevadilla, the dried fruit of *Assagraea Officinalis*. *N.O.* **Melan-thaceæ**.

a. Separate the seeds from Cevadilla (lb2), and grind them in a coffee-mill.

b. Make into a thick paste with *rectified spirit*, and percolate until the spirit ceases to be coloured.

(A *tincture* containing *gallate of veratria*, resins, &c., is formed).

c. Concentrate by distillation so long as no deposit forms ; and pour the residue, while hot, into twelve times its volume of cold water.

(Resins are precipitated).

d. Filter through calico ; wash the residue until the fluid ceases to precipitate with ammonia ; and add *liquor ammoniæ* in slight excess.

(Impure *veratria* is precipitated).

e. Collect the precipitate on a filter, and wash it till the water passes through colourless. Diffuse

the moist precipitate through water ($\frac{3}{4}$ 12), and add gradually *hydrochloric acid*, diligently stirring, to make the fluid feebly acid.

(A solution of impure *hydrochlorate of veratria* is formed).

f. Digest with *purified animal charcoal* (gr. 60) at a gentle heat for 20 minutes, filter, and cool.

(The solution is decolorized).

g. Add *solution of ammonia* in slight excess; collect the precipitate; and wash it until the washings cease to be affected by nitrate of silver acidulated with nitric acid. Dry by filtering paper, and then by gentle heat. (*Veratria* is thus obtained).

PROPERTIES AND TESTS.

1. *Veratria* is in the form of amorphous, pulverulent masses; pale-grey.

2. It has no odour, but is powerfully irritating to the nostrils.

3. The taste is strongly and persistently bitter and acrid.

4. Insoluble in water; soluble in boiling water (1 in 1000); rectified spirit (1 in 11); ether (1 in 6); readily in dilute acids.

5. Strong sulphuric acid changes *veratria* successively to yellow, blood-red, and violet.

PHARMACY.—*Officinal preparation*.—

Unguentum Veratriæ.

Veratria, gr. 8	} Rub the veratria and	
Olive oil, 3 $\frac{1}{2}$		oil together, and mix
Prepared lard, $\frac{3}{4}$ 1		with the lard.

ACTION.—Local anodyne. Internally, powerful emetic and drastic purgative, causing severe irritation. Vascular depressant.

GROUP XVII.—NEUTRAL PRINCIPLES.

1. **Digitalinum—Digitaline.**

SOURCE AND PREPARATION.—From the leaves of *Digitalis Purpurea*. N.O. **Scrophulariaceæ**.

a. Digest coarsely powdered *digitalis* ($\frac{3}{4}$ 40), with *rectified spirit* (C1) for 24 hours, at a temperature of 120° ; percolate with this and another gallon; distil and evaporate.

(An *extract* is formed containing *digitaline*, extractive and colouring matters, &c.).

b, Mix the extract with $\left\{ \begin{array}{l} \text{Water, } \frac{3}{4} 5 \\ \text{Acetic Acid, } \frac{3}{4} \frac{1}{2} \end{array} \right\}$; digest the solution with *purified animal charcoal* ($\frac{3}{4}$ $\frac{1}{4}$); filter, and dilute the filtrate to O1.

(A solution is formed containing *digitaline*, and colouring matters, with free acetic acid; this is decolorized).

c. Add *solution of ammonia* nearly to neutralization; and then $\left\{ \begin{array}{l} \text{Tannic acid, gr. 160} \\ \text{Water, } \frac{3}{4} 3. \end{array} \right.$

(Impure *digitaline* is precipitated).

d. Wash the precipitate; mix it with a small quantity of *rectified spirit* and *oxide of lead* ($\frac{3}{4}$ $\frac{1}{4}$); and rub them together in a mortar.

(Tannic acid is removed as *plumbic tannate*).

e. Heat for an hour at 160° with *rectified spirit* ($\frac{3}{4}$ 4); and add *purified animal charcoal* ($\frac{3}{4}$ $\frac{1}{4}$).

(Colouring matter is removed).

f. Filter; distil off the spirit carefully by the heat of a water-bath; and wash the residue repeatedly with pure ether.

(Oily matters are removed; *digitaline* remains).

PROPERTIES AND TESTS:—

1. *Digitaline* occurs in the form of small scales or porous mamillated masses.

2. It has a white or yellowish colour.
3. It is inodorous, but powerfully irritates the nostrils; has an intensely bitter taste.
4. Almost insoluble in water and pure ether; readily soluble in spirit; soluble in acids, but does not form neutral compounds with them.
5. Digitaline leaves no residue when burned with free access of air.

ACTION.—(See DIGITALIS). Dose—gr. $\frac{1}{60}$.

2. **Santoninum**—**Santonin** ($C_{15}H_{18}O_3$).

SOURCE AND PREPARATION.—From the unexpanded flower-heads of *Artemisia Santonica*. N.O. **Compositæ**.

a. Boil bruised *Santonica*, lb i, with $\left\{ \begin{array}{l} \text{Slaked lime, } \frac{3}{5} \\ \text{Water, C } 1 \end{array} \right.$ for an hour; strain, and press. Repeat the process with $\left\{ \begin{array}{l} \text{Slaked lime, } \frac{3}{2} \\ \text{Water, C } \frac{1}{2} \end{array} \right.$. Mix the liquids.

(A solution of *santonin* and oily matters, in combination with lime, is formed).

b. Allow the mixture to settle; decant the fluid; evaporate to O $2\frac{1}{2}$; while hot, add *hydrochloric acid*, with diligent stirring, until the fluid has become slightly but permanently acid; and set aside for 5 days.

(*Santonin* is precipitated; oil separates on the surface).

c. Skim off the oil; carefully decant the fluid; collect the precipitate on a paper filter; and wash it in succession with cold water, diluted *solution of ammonia* ($\frac{3}{2}$ to $\frac{3}{5}$), and again with cold water.

(Acids and colouring matters are removed).

d. Separate and dry the precipitate; mix it with *purified animal charcoal* (gr. 60); digest with *rectified spirit* ($\frac{3}{9}$) for half an hour, and boil for 10

minutes; filter while hot; wash the charcoal with boiling spirit ($\frac{3}{4}$ 1); set aside the filtrate for 2 days in a cool dark place to crystallize. More crystals may be obtained by concentrating the mother-liquor.

(*Santonin* crystallizes out).

e. Drain the crystals; purify by re-dissolving in boiling spirit, and re-crystallizing; and dry on filtering paper in the dark.

PROPERTIES AND TESTS:—

1. *Santonin* occurs in flat rhombic prisms.
2. It is colourless, but becomes *yellow* by exposure to light.
3. It has a feebly bitter taste.
4. Scarcely soluble in cold water; sparingly in boiling water; abundantly in chloroform and boiling rectified spirit, in fatty oils, and in solutions of the fixed alkalies, forming definite salts.
5. *Santonin* is fusible and sublimable with moderate heat.

ACTION.—Anthelmintic. *Dose*.—gr. 1 to 6 or 8.

GROUP XVIII.—SPECIAL ORGANIC ACIDS.

In this group are included certain acids derived from the vegetable kingdom, which have peculiar physiological actions and therapeutic uses.

1. { **Acidum Gallicum—Gallic Acid** = $\text{H}_3\text{C}_7\text{H}_3\text{O}_2$.
Acidum Tannicum—Tannic acid or
Tannin = $\text{C}_{27}\text{H}_{22}\text{O}_{17}$.

SOURCE AND PREPARATION.—These two acids are obtained from *gall-nuts*, the excrescences formed

by an insect (*Diplolepis Gallæ Tinctoriæ*) on the small twigs of the **Quercus Infectoria**.

N.O. Cupuliferæ.

Tannic acid exists in gall-nuts in the proportion of about 35 per cent.; gallic acid only amounts to about 5 per cent., but it is produced by the decomposition of tannic acid through the action of a nitrogenous ferment in the galls, and this explains the difference in the methods adopted for the preparation of the two acids. These methods may be thus contrasted:—

TANNIC ACID.	GALLIC ACID.
<p>a. Expose powdered galls to a damp atmosphere for 3 days, and then make a paste with ether.</p> <p>b. In 24 hours submit this to strong pressure; powder the pressed cake; again form a paste with ether mixed with $\frac{1}{8}$th its bulk of water; and press as before.</p> <p>c. Evaporate the mixed expressed liquids, first spontaneously, and subsequently by a little heat, to the consistency of a soft extract; and dry under 212°.</p>	<p>a. Make a thick paste of galls (lb 1) with water; and keep it moistened for 6 weeks, at a temperature of between 60° and 70°, adding water when required.</p> <p>b. Boil for 20 minutes with water ($\frac{3}{4}$ 45); strain through calico; collect and drain the deposit which forms on cooling.</p> <p>c. Press strongly between folds of filtering paper; and redissolve in boiling water ($\frac{3}{4}$ 10).</p> <p>d. When the fluid has cooled to 80°, pour it off from the crystals formed; wash these with ice-cold water; and dry, first by filtering paper, and finally, by heat under 100°.</p>

PROPERTIES AND TESTS.—These may also be presented in a tabular form, in order to indicate in what respects the two acids resemble and differ from each other.

TANNIC ACID.

GALLIC ACID.

a. In vesicular masses or thin scales.

b. Pale-yellow colour; glistening.

c. Strongly astringent taste.

d. Readily soluble in water (10 in 8); rectified spirit (10 in 8); very sparingly in ether; glycerine (1 in 3) or if warmed (1 in 2).

e. Bluish-black colour with persalts of iron.

f. Yellowish-white precipitates with gelatine and albumen; also precipitates alkaloïds.

g. Heated with free access of air, it partly melts, swells up, blackens, and finally burns away, leaving no residue.

h. Changed by the action of a ferment, and also by the action of alkalies or acids, into gallic acid and glucose.

a. In minute crystals,=acicular prisms or needles.

b. Generally pale-fawn colour; sometimes nearly white.

c. Taste much less astringent.

d. Much less soluble in water (1 in 100); boiling water (1 in 3); rectified spirit (1 in 8).

e. Bluish-black precipitate with persalts of iron.

f. No precipitate with gelatine, albumen, or alkaloids.

g. Changed by heating into pyrogalllic acid; leaves no residue when burned with free access of air.

h. Does not undergo any such decomposition.

PHARMACY.—I. *Officinal Preparations*:—

The official preparations are chiefly made from *tannic acid*, there being only one of *gallic acid*. They may be arranged thus:—

a. *Glycerinum* { *Acidi Gallici*
 Acidi Tannici }. Made respec-
tively by rubbing together { Gallic acid } 3
 Tannic acid } 1
with Glycerine, 3 4, and then dissolving by gentle
heat.

b. Suppositoria Acidi Tannici.

Made with $\left\{ \begin{array}{l} \text{Benzoated lard} \\ \text{White wax} \\ \text{Oil of Theobroma} \end{array} \right\}$.

Each suppository = gr. 15, and contains Tannic acid = gr. 3.

c. Suppositoria Acidi Tannici cum Sapone.

Made with $\left\{ \begin{array}{l} \text{Glycerine of Starch.} \\ \text{Curd Soap.} \\ \text{Starch.} \end{array} \right\}$ Tannic acid = gr. 3. in each.

d. Trochisci Acidi Tannici. Made with sugar, gum, &c.; and Tincture of Tolu. Each lozenge contains gr. $\frac{1}{2}$ of tannic acid.

2. *Incompatibles.* Of *tannic acid*, mineral acids; alkalies; salts of antimony, lead, and silver; persalts of iron; vegetable alkaloids; gelatine; and emulsions.

Of *gallic acid*, metallic salts; spirits of nitre.

ACTION.—Powerful astringent and styptic. *Tannic acid* acts best locally; *gallic acid* is preferable as an internal astringent.

Dose—gr. 2 to 10, 15, or more.

2. **Acidum Benzoicum** — **Benzoic Acid** = $\text{HC}_7\text{H}_5\text{O}_2$.

SOURCE AND PREPARATION.—From benzoin, a balsamic resin obtained from **Styrax Benzoin**. *N.O. Styracaceæ*. The acid is separated from the benzoin by sublimation, and is then condensed.

CHARACTERS AND PROPERTIES:—

1. Benzoic acid is in light, feathery, flexible, crystalline plates and needles.

2. Its colour is nearly white.

3. It has an agreeable aromatic odour, like benzoin.

4. Benzoic acid is sparingly soluble in water (1 in 400); boiling water (1 in 12); readily in

rectified spirit (1 in 3); also in solution of the caustic alkalies and lime, from which it is precipitated by hydrochloric acid, unless very dilute.

5. It melts, boils, and finally sublimes with heat.

PHARMACY.—Benzoic acid is used in making *Benzoate of Ammonia*.

ACTION.—Stimulant to mucous membranes. Stimulant expectorant. Diuretic, and makes the urine more acid, passing out as hippuric acid. Antiseptic.

Dose—gr. 5 to 30.

GROUP XIX.—SPECIAL PREPARATIONS.

There are a few preparations in the B.P., which cannot be classified under any of the foregoing groups, and which must be considered individually; but some of them will need little more than to be mentioned.

1. **Pyroxylin—Gun-Cotton.** This is made by immersing Cotton Wool, 1, in $\left\{ \begin{array}{l} \text{Sulphuric acid, 5} \\ \text{Nitric acid, 5} \end{array} \right\}$ for 3 minutes; washing with water until the washings give no precipitate with barium chloride; draining on filtering paper; and drying in a water-bath.

PHARMACY.—Gun-cotton is introduced into the B.P. for the purpose of making Collodion and Collodion Flexible.

2. **Collodion.**
Collodion Flexible or Flexible Collodion.

PREPARATION.—*Collodion* is prepared by dissolving pyroxylin in $\left\{ \begin{array}{l} \text{Ether, 2} \\ \text{Rectified spirit, 30.} \end{array} \right\}$

Collodion flexile is a mixture of $\left\{ \begin{array}{l} \text{Collodion, } \frac{3}{6} \\ \text{Canada Balsam, gr. 120} \\ \text{Castor Oil, } 3 \text{ i.} \end{array} \right.$

CHARACTERS AND PROPERTIES:—

1. Both are colourless liquids; highly inflammable.

2. They have a strong ethereal odour.

3. They dry rapidly when exposed to the air; and leave a thin transparent film on the skin, insoluble in water and rectified spirit. Collodion contracts in drying; flexible collodion does not contract.

ACTION.—Protectives. Collodion is a slight styptic.

3. **Pix Liquida—Tar.** A bituminous liquid obtained from the wood of *Pinus sylvestris* and other species, by destructive distillation. *N.O. Coniferae*. Tar is a substance of very complex composition.

CHARACTERS AND PROPERTIES:—

1. Tar is a thick and viscid substance.

2. It has a brownish-black colour.

3. It has a peculiar aromatic odour.

4. Water agitated with tar acquires a yellowish or brownish tint, an acid reaction, and a sharp empyreumatic taste.

5. It is soluble in equal parts of rectified spirit, and separates on the addition of water.

6. On distillation tar yields carbolic acid, pyroligneous acid, creosote, oil of turpentine, volatile oil, &c., and leaves pitch behind.

PHARMACY.—*Officinal Preparation:—*

Unguentum Picis Liquidæ $\left\{ \begin{array}{l} \text{Tar, } 5 \\ \text{Yellow wax, } 2. \end{array} \right.$

Mix together and stir till cold.

ACTION.—Stimulant to mucous membranes. Expecto- rant. Inhaled for bronchitis. A stimulant for external application in skin-diseases.

Dose—gr. 20 to 60.

4. *Cerevisiæ Fermentum* — Beer Yeast.

The ferment obtained in brewing beer. It is a viscid, semi-fluid, frothy substance, which presents under the microscope numerous round or oval con-fervoid cells = *Torula cerevisiæ*.

PHARMACY.—*Officinal Preparation* :—

<i>Cataplasma Fermenti</i>	{	Beer yeast, 6
		Flour, 4
		Water at 100°, 6.

Mix the yeast in the water; stir in the flour; and place near the fire till it rises.

ACTION.—External and internal stimulant and antiseptic. *Dose*—two tablespoonfuls.

5. *Mica Panis*—Crumb of bread. The soft part of bread made from wheaten flour. Merely used in making up pills.

6. *Amylum* — Wheat Starch = $C_6H_{10}O_5$. Starch obtained from the seed of *Triticum vulgare*—Wheat, by washing it out from the flour with water, separating, and collecting.

Starch occurs in white columnar masses; when rubbed with cold water, it is neutral in reaction, and the filtered liquid is not coloured blue with iodine. Mixed with boiling water and cooled, it gives a deep blue colour with iodine.

PHARMACY.—I. *Officinal Preparations* :—

<i>a. Glycerinum Amyli</i>	{	Starch, 1
		Glycerine, 8.

Intimately mix; then heat gradually to 240°, stirring until a translucent jelly is formed.

<i>b. Mucilago Amyli</i>	{	Starch, gr. 120
		Water, $\frac{3}{4}$ 10.

Add the starch gradually, triturating; and boil for a few minutes, while stirring.

2. *Starch* is used in making some of the *Suppositories*; and is contained in *Pulvis Tragacanthæ Compositus*.

Mucilage of starch is in all the official *Enemata* except one (Tobacco).

ACTION.—Demulcent. Nutrient.

7. **Theriaca—Treacle.** The uncrystallized residue of the refining of sugar.

Saccharum Purificatum—Refined Sugar. The crystalline refined juice from the stem of **Saccharum officinarum.** *N.O. Graminaceæ.*

CHARACTERS.—*Treacle* is a well-known thick, brown, very sweet, fermentable syrup.

Refined sugar or “lump sugar” is in conical loaves, compact, white, and crystalline.

PHARMACY.—1. *Officinal Preparation* :—

<i>Syrupus</i>	{	Refined Sugar, lb. 5
Sp. gr. 1.33		Water, O 2.

Dissolve by heat, and after cooling add water to make the weight = lb 7½.

2. *Treacle* is used in the preparation of certain pill-masses. *Sugar* is an ingredient of many confections, lozenges, mixtures, pills, powders, syrups, &c., to give cohesion or consistence, to suspend ingredients, to preserve from chemical changes, or to act as a flavouring agent.

ACTION.—Treacle is aperient. Sugar is nutrient, and demulcent in the form of syrup.

THE ANIMAL KINGDOM.

The therapeutic agents derived from the Animal kingdom may be conveniently discussed according to the following plan:—

I. LIVING ANIMAL.

1. **Hirudo—Leech.** There are two kinds of leeches, namely, (*a*). *Sanguisuga Medicinalis*, the *speckled leech*; which has a greenish-yellow belly, spotted with black. (*b*). *S. Officinalis*, the *green leech*, in which the belly is olive-green and not spotted. Class, *Annelida*. They are collected in Spain, France, Italy, and Hungary. Leeches are used for the local removal of blood, each drawing from 1 to 2 drachms.

II. DEAD INSECTS.

1. **Cantharis—Cantharides.** The dried *Cantharis vesicatoria*, *Blister Beetle*, or *Spanish Fly*. Order, *Coleoptera*. Chiefly collected in Russia, Sicily, and Hungary. These insects swarm on the trees about May or June, and are collected by shaking the branches, or brushing them off by masked persons, and catching them in linen cloths; they are then killed by plunging them into boiling vinegar, and afterwards dried.

CHARACTERS AND PROPERTIES:—

- a.* Cantharides is from 8 to 10 lines long
- b.* It presents 2 wing-covers (*elytræ*), of a shining metallic-green colour; under which are two membranous transparent wings.

c. The powder is greyish-brown, and contains shiny green particles of the elytræ.

d. The odour is peculiar, strong, and disagreeable.

e. Spanish fly has a burning taste.

COMPOSITION.—The chief constituents of cantharides are:—

a. *Cantharidine*, the active principle—a crystalline, volatile substance; chiefly soluble in ether, chloroform, and glacial acetic acid.

b. Oily and fatty principles.

c. Green and yellow colouring matters.

ADULTERATIONS.—Coloured glass tubes and beads. The golden beetle. The powder should be free from mites.

PHARMACY.—*Officinal Preparations*:—

a. *Acetum Cantharidis*.—Intense brown.

(i) Digest for two hours at 200° { Cantharides, in powder, 2
Glacial acetic acid, 2
Acetic acid, 13.

(ii) Percolate when cold; pour acetic acid, 5, over the residuum; press; and make the whole liquid up to 20 with acetic acid.

b. *Charta Epispastica*—*Blistering paper*.

(i) Digest in a water-bath for 2 hours, stirring constantly { White wax, 4
Spermaceti, $1\frac{1}{2}$
Olive oil, 2
Resin, $\frac{3}{4}$
Cantharides in powder, 2
Water, 6.

(ii) Strain; and separate the plaster from the watery fluid.

(iii) Melt the plaster in a shallow vessel, and mix Canada balsam, $\frac{1}{4}$.

(iv) Pass one surface of strips of paper over the surface of the hot liquid, so that it shall receive a thin coating of plaster.

c. Emplastrum Cantharidis—Blistering plaster.

Melt	{	Yellow wax, $7\frac{1}{2}$	} Stir in Cantharides, 12,		
		Suet, $7\frac{1}{2}$		} in very fine powder, and	
		Resin, 3			} continue stirring until
		Lard, 6			

d. Emplastrum Calefaciens.

(i) Infuse for { Cantharides, in coarse powder, 1 } ;
 6 hours { Boiling water, 5 } ;
 strain; press through calico;
 and evaporate to $\frac{1}{3}$.

(ii) Add	{	Expressed oil of nutmeg, 1	} Melt, and		
		Yellow wax, 1		} stir all	
		Resin, 1			} together.
		Soap plaster, 13			
		Resin plaster, 8			

e. Liquor Epispasticus—Blistering fluid.

Macerate for { Cantharides, in } and percolate
 24 hours { powder, 8 } , with ether to
 { Acetic acid, 4 } 20.

f. Tinctura Cantharidis.

Cantharides, in coarse powder, 1	}	} Macerate 7 days; strain;
Proof spirit, 80.		} up to 80.

g. Unguentum Cantharidis.

(i) Digest { Cantharides, 1 } ; and then for $\frac{1}{4}$
 for 12 hours { Olive oil, 6 } ; hour at 212° .

(ii) Strain through muslin with strong pressure;
 add to Yellow Wax, 1, melted; and stir till cold.

ACTION.—Rubefacient or vesicant. Internally
 diuretic; spinal stimulant; aphrodisiac.

Dose.—Of tincture, $m\bar{5}$ to 20.

2. **Coccus—Cochineal.** The dried female insect, *Coccus Cacti*. Class *Hemiptera*. Reared on plantations of the Nopal Cactus in Mexico and Teneriffe. When the female insects are fecundated, they are swept off the trees, killed by immersion in boiling water, and dried. They are about 2 lines long; ovate and plano-convex; black or greyish-white; and wrinkled. Cochineal contains a colouring matter, known as *carmine*, which is a dibasic acid—*carminic acid*. The powder is puce-coloured.

PHARMACY.—1. *Official Preparation* :—

Tinctura Cocci.

Cochineal, in powder, 1	} Macerate 7 days; strain; and make up to 20.
Proof spirit, 8.	

Dose.—m 30 to 90.

2. *Cochineal* is contained in :—

Tinctura Cardamomi Composita.

Tinctura Cinchonæ Composita.

ACTION.—Chiefly used as a colouring agent. Supposed to act as a sedative in whooping-cough.

III. PARTS OF ANIMALS, MODIFIED OR PREPARED.

1. **Adeps Præparatus—Prepared lard.** The purified internal fresh fat of the abdomen of the Hog—*Sus Scrofa*, belonging to the *Ungulata*. It is purified by removing the attached membranes; washing with cold water; straining and draining; melting under 212° ; and again straining through flannel.

CHARACTERS AND PROPERTIES :—

- a. Lard is a white, soft, fatty substance.
- b. It melts at about 100° .
- c. It should not have a rancid odour.
- d. Entirely soluble in ether and oil of turpentine.
- e. Consists chiefly of stearine, with some oleine.
- f. Lard is liable to be adulterated with salt and starch. If it contains water, it tends to become mouldy.

PHARMACY.—1. *Officinal Preparation* :—

Adeps Benzoatus. Prevents rancidity.

Prepared lard, ℥i	} Heat for 2 hours in a water-bath, and strain.
Benzoin, coarsely powdered, gr. 160	

2. *Lard* is contained in most ointments, and in curd soap. *Benzoated lard* is used for making suppositories; and in the ointment of galls, lead, sulphur, and zinc.

ACTION.—Emollient. Protective.

2. *Sevum Præparatum* — **Prepared Suet.**

The internal fat of the abdomen of the sheep—*Ovis Aries*, belonging to the *Ungulata*. It is purified by melting, and straining through coarse linen or flannel. Suet is white, smooth, almost odourless; fusible at 103° ; and composed almost entirely of stearine, with a little oleine and palmitine, being the hardest of all the solid fats.

Suet is contained in *Emplastrum Cantharidis* and *Unguentum Hydrargyri*.

3. **Castoreum—Castor.** The dried preputial follicles and their secretions of *Castor Fiber*, the *Beaver*, belonging to *Rodentia*, imported from Hudson's Bay. The oil-sacks are rejected.

CHARACTERS AND PROPERTIES :—

- a. The follicles are in pairs, united by a common duct.
- b. Each follicle is pear-shaped or fig-shaped; and about 3 inches long.

c. It is firm and heavy; full and plump, or wrinkled.

d. It has a brown or greyish-black colour.

e. The secretion has a strong peculiar odour; and consists of *castorine*, a white crystalline fatty principle, and a *volatile oil*. Salicine, carbolic acid, and carbonate of ammonia are also said to be present. The contents of the follicles should be in great part soluble in rectified spirit and ether.

PHARMACY.—*Officinal Preparation*.—

Tinctura Castorei.

Castor, in coarse	} Macerate 7 days; strain; and make up to 20.
powder, 1	
Rectified spirit, 20	

Dose— $3\frac{1}{2}$ to 1.

ACTION.—Stimulant. Antispasmodic.

4. **Ichthyocolea**—**Isinglass** is recognised in the *Appendix* of the B.P. This substance is the swimming-bladder of the *Sturgeon*, dried, and cut into shreds. It consists of gelatine. A solution is employed as a test for tannic acid. It is nutritious and demulcent.

IV. SECRETIONS OR THEIR CONSTITUENTS.

1. **Lac—Milk**. Fresh milk from the *Cow*, *Bos Taurus*, belonging to *Ungulata*. It is only used in the B.P. in making *Mistura Scammonii*.

2. **Saccharum Lactis—Sugar of Milk**. A crystallized sugar—*Lactose*, obtained from the whey of cow's milk by evaporation. It is in cakes or fragments; white or greyish-white and translucent; hard, and gritty when chewed; faintly sweet. Soluble in water (1 in 5); boiling water, (1 in 3); slightly in rectified spirit.

Sugar of milk is only used in the B.P. to divide the dose of elaterium in *Pulvis Elaterii Compositus*.

3. **Mel—Honey.** A saccharine secretion deposited in the honey-comb by the *Hive bee—Apis Mellifica*, belonging to *Hymenoptera*. Its characters are sufficiently well-known. It is liable to be adulterated with starch.

PHARMACY.—1. *Officinal Preparations* :—

a. *Mel depuratum*—*Clarified honey*.

b. *Mel boracis* (see BORAX).

c. *Oxymel*.

Clarified honey, 8	} Liquefy the honey by heat, and mix with the other ingredients.
Acetic acid, 1	
Water, 1	

Dose—3 i to 2.

2. *Clarified honey* is contained in several Confections.

ACTION.—Demulcent. Laxative. Also as a flavouring agent.

4. **Cera Flava et Alba—Yellow and White Wax.** The honey-comb melted in boiling water and cooled constitutes *yellow wax*. When this is bleached by exposing it to moisture, air, and light, it forms *white wax*. The appearances of these two forms of wax are sufficiently familiar. They should not be unctuous to the touch. They are soluble in oil of turpentine; not in cold alcohol. They should not melt under 140° and 150° respectively. They are liable to be adulterated with lard, suet, tallow, resin, and starch.

PHARMACY.—*Yellow wax* is used as an ingredient in several ointments and plasters. The ointments keep for a longer time without becoming rancid, than if made with white wax. (Squire).

White wax is an ingredient in	{	Unguentum	Cetacei
		„	Plumbi Subacetatis
		„	Compositum
		„	Simplex;

in several suppositories; and in Charta Epispastica.

Unguentum Simplex.

White wax, 2	} Melt together, and stir <i>till</i> <i>the mixture becomes solid.</i>
Prepared lard, 3	
Almond oil, 3	

ACTION.—Emollient. Chiefly employed to give consistence.

5. **Cetaceum—Spermaceti.** A white concretion prepared from the oily matter contained in cavities in the head of the *Physeter Macrocephalus*, or *Sperm Whale*, belonging to the *Cetacea*. It is separated from the sperm-oil by cooling, filtration, and pressure; and is afterwards purified by melting and straining. It consists of nearly pure *Cetine* or *palmitate of cetyl*.

CHARACTERS AND PROPERTIES:—

a. Spermaceti is a crystalline, fatty substance, but scarcely unctuous to the touch.

b. It is pearly-white, glistening, translucent.

c. It has but little taste or odour.

d. It can be powdered by adding a little rectified spirit.

e. It should not melt under 100°.

f. Soluble in fixed and volatile oils and fats; in boiling ether; and in boiling alcohol.

PHARMACY.—1. *Official Preparation:—**Unguentum Cetacei.*

Spermaceti, 5	} Melt, and stir <i>till the mixture</i> <i>cools.</i>
White wax, 2	
Almond oil, 20	

2. Spermaceti is contained in Charta Epispastica.

ACTION.—Emollient and demulcent. Chiefly used externally.

6. **Pepsina.** A nitrogenous substance, one of the active constituents of gastric juice, prepared from the mucous lining of the fresh and healthy stomach of the pig, sheep, or calf. It is made by by cleansing the mucous membrane; scraping it

with a blunt knife or other suitable instrument; and drying the viscid pulp thus obtained under 100° . Pepsine thus prepared is a light yellowish-brown powder; with a faint odour, and slightly saline taste; very little soluble in water or spirit.

Two grains with $\left\{ \begin{array}{l} \text{Water, } \frac{3}{4} \\ \text{Hydrochloric acid, } m 5 \end{array} \right\}$ will digest 100 grains of hard-boiled white of egg, in thin shavings, when kept at 98° for 4 hours.

ACTION.—Digestant. *Dose*—gr. 2 to 5.

7. **Fel Bovinum Purificatum**—**Fresh Ox-bile.**

Prepared by agitating $\left\{ \begin{array}{l} \text{Fresh ox-gall, } 1 \\ \text{Rectified spirit, } 2 \end{array} \right\}$;

setting aside for 12 hours; decanting; and evaporating over a water-bath to a pill-consistence. Ox-gall is a yellowish-green substance; with a sweet and bitter taste; soluble in water and spirit; insoluble in ether.

ACTION.—Laxative. Substitute for bile. *Dose*—gr. 2 to 6.

8. **Moschus**—**Musk.** The inspissated and dried secretion from the preputial follicles of the *Moschus Moschiferus*, the *Musk Deer*, belonging to *Ungulata*. Each sac yields from 103 to 200 grains. There are two varieties of musk imported, namely, China or Thibet, which is the better, and Russian or Siberian. It is in the form of small, irregular, concreted grains; reddish-black; rather unctuous; with a powerful, peculiar, diffusible, and persistent odour; and a bitter aromatic taste. Musk is soluble in water and alcohol. It consists of a peculiar odorous principle, volatile oil, ammonia, cholesterine, stearine, oleine, albumen, and salts.

ACTION.—Stimulant. Antispasmodic.

Dose—gr. 5 to 10.

V. PREPARATION FROM AN ORGAN.

1. **Oleum Morrhuæ—Cod liver oil.** The oil extracted from the fresh liver of *Gadus Morrhuæ*, the *Cod*. Class, *Pisces*. It is obtained by the application of a heat not exceeding 180°. Cod liver oil contains glycerine; oleic, margaric, butyric, and acetic acids; gaduin, a peculiar substance; biliary principles; a small quantity of iodine; and traces of bromine, chlorine, phosphorus, and salts. The best oil is pale-yellow, but it varies in colour to dark-brown. It has a more or less fishy odour and taste.

ACTION.—Nutrient. Tonic. Alterative.

Dose—3 i to 8.

VI. OVUM—EGG.

The egg of *Gallus Banckiva*, the *Common Fowl*, Class, *Aves*, is officinal in the following forms:—

1. **Albumen Ovi—White of egg**, which is in the *Appendix* of the B.P., as a *test-solution* to determine the absence of metaphosphoric acid from dilute phosphoric acid. It is also a valuable demulcent and nutrient.

2. **Vitellus Ovi—Yolk of egg**, which is an ingredient in *Mistura Spiritus Vini Gallici*; and is employed for making emulsions.

SECTION IV.

SUMMARY OF OFFICIAL PREPARATIONS.

The official preparations of the B.P. have already been considered as regards:—1. Their general nature, and the methods of preparing the several groups; 2. The preparations of particular drugs. It is proposed now to give a summary of the members belonging to each group, also indicating the proportions of their important ingredients, where needed; and the doses of the preparations used for internal administration.

I. ACETA—VINEGARS.

1. Acetum—British vinegar.
2. „ Cantharidis (for external use).
3. „ Scillæ. *Dose*— $\text{m}\frac{1}{5}$ to 40.

II. AQUÆ—WATERS.

1. Aqua Destillata—Distilled water.
2. Solutions { *a.* Aqua Chloroformi } *Dose*—
in water { *b.* „ Camphoræ } $\frac{3}{4}$ 1 to 2.
3. Waters containing volatile oils, and prepared by distillation. (*See* VOLATILE OILS).

III. CATAPLASMATA—POULTICES.

1. Simple { *a.* Cataplasma Fermenti.
b. „ Lini.
2. Containing { *a.* Cataplasma Carbonis.
special ingre- *b.* „ Conii.
dients. *c.* „ Sinapis.
d. „ Sodæ Chloratæ.

IV. CHARTÆ—PAPERS.

1. Charta Epispastica—Blistering paper.
2. „ Sinapis—Mustard leaf.

V. CONFECTIONES—CONFECTIONS.

1. Simple. (Used for making up pills). {
 - a.* Confectio Rosæ Caninæ.
 - b.* „ „ Gallicæ.
2. Containing active ingredients {
 - a.* Confectio Opii = 1 in 40 nearly . . . Dose. gr. 5-20.
 - b.* Confectio Piperis . . . gr. 60-120.
 - c.* „ Scammonii . . . gr. 15 40.
 - d.* „ Sennæ, (contains laxative fruits) . . . 3 1-4.
 - e.* „ Sulphuris, (contains Acid Tartrate of Potash) . . . 3 1-2.
 - f.* „ Terebinthinæ 3 ½ upwards.

VI. DECOCTA—DECOCTIONS.

1. Simple decoctions. {
 - a.* Decoctum Cetrariæ . . . Dose. 3 1-2
 - b.* „ Cinchonæ Flavæ 3 ½-2
 - c.* „ Granati Radicis { 3 1-2 or more.
 - d.* „ Hæmatoxyii . . . 3 1-3 2
 - e.* „ Hordei . . . *ad lib.*
 - f.* „ Papaveris (for external use).
 - g.* „ Pareiræ . . . 3 1-2
 - h.* „ Quercus (for external use).
 - i.* „ Sarsæ . . . 3 4-8
 - j.* „ Scoparii . . . 3 1-2
 - k.* „ Taraxaci . . . 3 1-2
 - l.* „ Ulmi (chiefly for external use) . . . 3 2-4

2. Compound decoctions.	{	<i>a.</i> Decoctum Aloes Compositum	
		<i>b.</i> „ Sarsæ Compositum	$\frac{3}{4}$ 2 3 3.6

VII. EMPLASTRA—PLASTERS.

1. Simple plasters, used for protection or support.	{	<i>a.</i> Emplastrum Cerati Saponis.	
		<i>b.</i> „ Ferri.	
		<i>c.</i> „ Plumbi.	
		<i>d.</i> „ Resinæ.	
		<i>e.</i> „ Saponis.	
2. Stimulant and alterative plasters.	{	<i>a.</i> Emplastrum Ammoniaci cum Hydrargyro.	
		<i>b.</i> „ Galbani.	
		<i>c.</i> „ Hydrargyri.	
		<i>d.</i> „ Picis.	
		<i>e.</i> „ Plumbi Iodidi.	
3. Rubefacient or vesicant plasters.	{	<i>a.</i> Emplastrum Calefaciens.	
		<i>b.</i> „ Cantharidis.	
4. Anodyne or sedative plasters.	{	<i>a.</i> Emplastrum Belladonnæ.	
		<i>b.</i> „ Opii.	

VIII. ENEMATA—CLYSTERS.

1. Enema Aloes, gr. 40 in $\frac{3}{4}$ 10.
2. „ Assafoetidæ, gr. 30 in $\frac{3}{4}$ 4 of *cold water*.
3. „ Magnesiz Sulphatis, $\frac{3}{4}$ 1 in $\frac{3}{4}$ 15 with Olive Oil, $\frac{3}{4}$ 1.
4. „ Opii, $\frac{3}{4}$ 1 of Tincture in $\frac{3}{4}$ 2.
5. „ Tabaci, gr. 20 in $\frac{3}{4}$ 8 of *boiling water*.
6. „ Terebinthinæ, $\frac{3}{4}$ 1 in $\frac{3}{4}$ 15.

IX. ESSENTIÆ—ESSENCES.

1. Essentia Anisi.	{	Solutions of <i>Volatile Oils</i> in
2. „ Menthæ.		<i>Rectified Spirit</i> , 1 in 4.
Piperitæ.		<i>Dose</i> — $\frac{1}{2}$ 10 to 20.

X. EXTRACTA—EXTRACTS.

A. GREEN EXTRACTS.

		Dose.
1. From fresh leaves and flowering tops.	Extractum Aconiti	gr. 1-2
2. From fresh leaves and young branches.	<i>a.</i> Extractum Belladonnæ <i>b.</i> " Conii <i>c.</i> " Hyoscyami	gr. $\frac{1}{4}$ - $\frac{1}{2}$ gr. 2-8 gr. 3-6
4. From flowering herb.	Extractum Lactuæ .	gr. 5-10
5. From resh corms.	<i>a.</i> Extractum Colchici <i>b.</i> " " Ace- ticum.	gr. $\frac{1}{2}$ -2
6. From root—	Extractum Taraxaci	gr. 5-15

B. AQUEOUS EXTRACTS.

		Dose.
1. Digested in boiling water.	<i>a.</i> Extractum Aloes Barba- densis <i>b.</i> Extractum Aloes Socot- rinæ <i>c.</i> Extractum Pareiræ	gr. $\frac{1}{2}$ -2 gr. $1\frac{1}{2}$ -3 gr. 10-20
2. Infused in boiling water, and then boiled.	<i>a.</i> Extractum Gentianæ <i>b.</i> " Hæmatoxyli	gr. 5-15 gr. 10-30
3. Boiled, and volatile oil added.	Extractum Anthemidis .	gr. 3-10
4. Macerated in cold water.	<i>a.</i> Extractum Calumbæ <i>b.</i> " Glycyrrhizæ <i>c.</i> " Kramerizæ <i>d.</i> " Opii <i>e.</i> " Quassizæ	gr. 2-10 3 $\frac{1}{2}$ -1 gr. 5-20 gr. $\frac{1}{2}$ -1 gr. 3-5

C. ALCOHOLIC EXTRACTS.

- | | | | |
|--|---|------------------------------|------------------------------------|
| 1. Prepared with rectified spirit. | { | a. Extractum Cannabis Indicæ | gr. $\frac{1}{4}$ -1 |
| | | b. „ Nucis Vomicae | gr. $\frac{1}{3}$ -2 |
| | | c. „ Physostigmatis | |
| | | Fabæ | gr. $\frac{1}{16}$ - $\frac{1}{4}$ |
| 2. Prepared with rectified spirit and water. | { | a. Extractum Jalapæ | gr. 5-15 |
| | | b. „ Lupuli | gr. 5-10 |
| | | c. „ Papaveris | gr. 2-5 |
| | | d. „ Rhei | gr. 3-8 |

D. ETHEREAL EXTRACTS.

1. Extractum Filicis Liquidum . m 15-30
2. „ Mezerei Æthereum (contained in Linimentum Sinapis Compositum.)

E. LIQUID EXTRACTS.

1. Extractum Belæ Liquidum . 3 1-2
2. „ Cinchonæ Flavæ Liquidum m 10-30
3. „ Ergotæ Liquidum . m 10-60
4. „ Glycyrrhizæ Liquidum { 3 1 or more.
5. „ Opii Liquidum . m 10-40
6. „ Pareiræ Liquidum . 3 $\frac{1}{2}$ -2
7. „ Sarsæ Liquidum . 3 1-4
8. „ Filicis Liquidum is also a *liquid extract*, but is made entirely with ether, and therefore belongs properly to the last group.

XI. GLYCERINA—GLYCERINES.

- | | |
|-------------------------------|-----------|
| 1. Glycerinum Acidi Carbolici | } i in 4. |
| 2. „ „ Gallici | |
| 3. „ „ Tannici | |
| 4. „ Boracis | |
| 5. „ Amyli, . . . | i in 8. |

XII. INFUSA—INFUSIONS.

A. SIMPLE INFUSIONS.

		Dose.
$\frac{3}{3}$ 1 in $\frac{3}{3}$ 10	Infusum Cascarillæ . . .	$\frac{3}{3}$ 1-3
	„ Dulcamaræ . . .	$\frac{3}{3}$ 1-4
	„ Sennæ (contains ginger, gr. 30) . . .	$\frac{3}{3}$ 1-4
$\frac{3}{3}$ $\frac{1}{2}$ in $\frac{3}{3}$ 10	Infusum Anthemidis . . .	$\frac{3}{3}$ 1-2
	„ Aurantii . . .	$\frac{3}{3}$ 1-2
	„ Buchu . . .	$\frac{3}{3}$ 1-2
	„ Calumbæ (cold water)	$\frac{3}{3}$ 1-3
	„ Cinchonæ Flavæ . . .	$\frac{3}{3}$ 1-2
	„ Cuspariæ, (water = 120°)	$\frac{3}{3}$ $\frac{1}{2}$ -2
	„ Cusso . . .	$\frac{3}{3}$ 4-8
	„ Krameriæ . . .	$\frac{3}{3}$ 1-2
	„ Lupuli . . .	$\frac{3}{3}$ 1-2
	„ Maticæ . . .	$\frac{3}{3}$ 1-2
$\frac{160}{3}$ gr. in $\frac{3}{3}$ 10	„ Senegæ . . .	$\frac{3}{3}$ $\frac{1}{2}$ -2
	„ Uvæ Ursi . . .	$\frac{3}{3}$ 1-2
$\frac{160}{3}$ gr. in $\frac{3}{3}$ 10	Infusum Catechu, (contains cinnamon, gr. 30) . . .	$\frac{3}{3}$ 1-2
	„ Lini, (contains liquorice, gr. 60) . . .	$\frac{3}{3}$ 2-4
$\frac{3}{3}$ 2 in $\frac{3}{3}$ 10	Infusum Caryophylli . . .	$\frac{3}{3}$ $\frac{1}{2}$ -2
	„ Chirataë, (water = 120) . . .	$\frac{3}{3}$ $\frac{1}{2}$ -2
	„ Ergotæ . . .	$\frac{3}{3}$ 2 $\frac{1}{2}$
	„ Rhei . . .	$\frac{3}{3}$ $\frac{1}{2}$ -2
	„ Rosæ Acidum (contains dilute sulphuric acid, 3 i) . . .	$\frac{3}{3}$ 1-2
$\frac{3}{3}$ 1 in $\frac{3}{3}$ 10	Infusum Serpentariæ . . .	$\frac{3}{3}$ 1-2
	„ Valerianæ . . .	$\frac{3}{3}$ 1-2
$\frac{3}{3}$ 1 in $\frac{3}{3}$ 10	Infusum Quassiæ (cold water)	$\frac{3}{3}$ 1-2
$\frac{3}{3}$ $\frac{1}{2}$ in $\frac{3}{3}$ 10	— Infusum Digitalis . . .	$\frac{3}{3}$ 2-3 i

B. COMPOUND INFUSIONS.

Infusum Gentianæ Compositum}	
„ Aurantii „ }	3 1-2

XIII. INJECTIO—INJECTION.

1. Injectio Morphiæ Hypodermica=gr. 1 of Acetate of Morphia in 12 minims.

XIV. LINIMENTA—EMBROCATIONS.

1. Mixtures with or solutions in Olive Oil.	a.	Linimentum Ammoniaë, 1 of <i>Liquor Ammoniaë</i> in 4.
	b.	Linimentum Calcis, 1 of <i>Liquor Calcis</i> in 2.
	c.	Linimentum Camphoræ, 1 in 5.
2. Mixtures with or solutions in Camphor Liniment.	a.	Linimentum Chloroformi, 1 in 2.
	b.	„ Terebinthinæ Aceticum. (Equal parts of each ingredient).
	c.	Linimentum Hydrargyri. (Equal parts of ointment of mercury, solution of ammonia, and camphor liniment).
3. Prepared by maceration and percolation with rectified spirit, camphor being then added.	a.	Linimentum Aconiti
	b.	„ Belladonæ } 1 in 1

- | | | |
|---|---|---|
| 4. Special
liniments, of
more complex
composition. | { | a. Linimentum Camphoræ Compositum. |
| | | b. Linimentum Crotonis. |
| | | c. " Iodi. |
| | | d. " Potassi Iodidi cum Sapone. |
| | | e. Linimentum Saponis. |
| | | f. " Sinapis Compositum. |
| 5. Mixture
with Soap
Liniment. | { | g. " Terebinthinæ. |
| | | a. Linimentum Opii. (An equal proportion of Tincture of Opium). |

XV. LIQUORES—SOLUTIONS.

This is a very large group of pharmaceutical preparations, and one difficult to classify. The following arrangement has appeared to me practically useful, both for remembering them and for reference.

1. Liquor Iodi, gr. 20 in $\frac{3}{4}$ i (contains Iodide of Potassium, gr. 20).
 2. Solutions of (a. Liquor Chlori, gr. 2·66 in $\frac{3}{4}$ i.
or yielding } b. " Calcis Chloratæ = gr. 13
free } of Chlorine in $\frac{3}{4}$ i.
Chlorine. { c. " Sodæ Chloratæ.
- Dose.
- | | | | |
|---|---|---|--------------------|
| 3. Solutions
of Alkalies
or Alkaline
Earths. | { | a. Liquor Ammoniaë Fortior,
gr. 15·83 in 3 i. | |
| | | b. Liquor Ammoniaë, gr. 5·2
in 3 i | ℥ 10-30 |
| | | c. Liquor Potassæ, gr. 27
in 3 i | ℥ 15-3 i |
| | | d. Liquor Sodæ, gr. 18·8
in 3 i | 3 $\frac{1}{4}$ -1 |
| | | e. Liquor Calcis, gr. $\frac{1}{2}$ in 3 i | 3 $\frac{1}{2}$ -4 |
| | | f. Liquor Calcis Saccharata,
gr. 7·11 in 3 i | ℥ 15-3 i |

4. Solutions of Carbonates, Acetates, or Citrates of Alkalies or Alkaline Earths.	a.	Liquor Ammoniaë Acetatis	3 2-6
	b.	" " Citratis	3 2-6
	c.	" Lithiæ Effervescens	3 5-10
	d.	" Potassæ "	} <i>ad lib.</i>
	e.	" Sodæ "	
	f.	" Magnesiæ Carbonatis	3 1-2
	g.	" " Citratis	3 5-10

5. Solutions containing Arsenic.	a.	Liquor Arsenicalis	} gr. 4 in 3 1
	b.	Liquor Arsenici Hydrochlorici	
	c.	Liquor Sodæ Arseniatis, gr. 4 of Arseniate of Soda in 3 1 . . .	<i>Dose</i> m 3-10

6. Solutions containing Salts of Iron.	a.	Liquor Ferri Perchloridi Fortior.	
	b.	" " Perchloridi	} m 10-40
	c.	" " Pernitratidis	
	d.	" " Persulphatis.	

7. Solutions of Salts of Mercury	a.	Liquor Hydrargyri Nitratis Acidus.	
	b.	Liquor Hydrargyri Perchloridi, gr. ½ in 3 1 (contains Ammonium Chloride)	<i>Dose</i> 3 ½-2

8. Solutions containing Lead	a.	Liquor Plumbi Subacetatis.	
	b.	Liquor Plumbi Subacetatis Dilutus.	

9. Special solutions of Inorganic Salts.	a.	Liquor Antimonii Chloridi.	
	b.	Liquor Bismuthi et Ammoniaë Citratis.	<i>Dose</i> — 3 ½-2
	c.	Liquor Potassæ Permanganatis.	
	d.	Liquor Zinci Chloridi.	

		Dose.
10. Solutions of Alkaloids or their salts =	<i>a.</i> Liquor Atropiæ	m 2-4
	<i>b.</i> „ Atropiæ Sulphatis	
	<i>c.</i> „ Morphiæ Acetatis	
	<i>d.</i> „ Morphiæ Hydrochloratis	m 10-40
	<i>e.</i> „ Strychniæ	
gr. 4 in $\frac{3}{4}$ l		m 5
11. Special solutions	<i>a.</i> Liquor Epispasticus.	
	<i>b.</i> „ Gutta-percha.	

XVI. LOTIONES—LOTIONS.

1. Lotio Hydrargyri Flava (Yellow wash).
2. „ Hydrargyri Nigra (Black wash).

XVII. MELLITA—HONEY.

1. Mel Depuratum—Purified honey.
2. Mel Boracis.

XVIII. MISTURÆ—MIXTURES.

	Dose.
Mistura Ammoniæ	$\frac{1}{2}$ - 1
„ Amygdalæ	1 - 2
„ Creasoti	1 - 2
„ Cretæ	1 - 2
„ Ferri Aromatica	$\frac{1}{2}$ - 2
„ Ferri Composita	$\frac{1}{2}$ - 2
„ Gentianæ	$\frac{1}{2}$ - 1
„ Guaiaci	$\frac{1}{2}$ - 2
„ Scammonii	$\frac{1}{2}$ - 2
„ Sennæ Composita	1 - 2
„ Spiritus Vini Gallici	$\frac{1}{2}$ - 2

XIX. MUCILAGINES—MUCILAGES.

1. Mucilago Acaciæ. Used in making lozenges.
2. „ Amyli. Used in enemata.
3. „ Tragacanthæ.

XX. OLEA—OILS.

These preparations have been already fully discussed, and it will suffice here to sum them up in the following way:—

1. Oils from the Vegetable Kingdom.
 - a.* Simple fixed oils.
 - b.* Ordinary volatile oils.
 - c.* Concrete oils.
 - d.* Oils with special actions.
2. Cod liver oil.
3. Oleum Phosphoratum = gr. $\frac{1}{32}$ of Phosphorus in ℥5.
Dose—℥ 5-10.

XXI. OXYMELLITA—OXYMELS.

- | | Dose. |
|----------------------------|-------|
| 1. Oxymel | 3 ℥-4 |
| 2. Oxymel Scillæ | 3 ℥-4 |

XXII. PILULÆ—PILLS.

These preparations may be arranged thus:—

- | | | Dose. |
|---|--|----------|
| 1. Aperient
or
Purgative
Pills.
All contain
Aloes, except
the last. | <i>a.</i> Pilula Aloes Barbadosensis | gr. 5-10 |
| | <i>b.</i> „ Aloes Socotrinæ . | gr. 5-10 |
| | <i>c.</i> „ Aloes et Assafoetidæ | gr. 5-20 |
| | <i>d.</i> „ Aloes et Ferri . | gr. 5-10 |
| | <i>e.</i> „ Aloes et Myrrhæ | gr. 5-15 |
| | <i>f.</i> „ Cambogiæ Composita | gr. 5-15 |
| | <i>g.</i> „ Colocynthis „ | gr. 5-15 |
| | <i>h.</i> „ Colocynthis et Hyos-
cyami . . . | gr. 5-15 |
| | <i>i.</i> „ Rhei Composita. | gr. 5-20 |
| | <i>j.</i> „ Scammonii Composita
(does not contain Aloes). | gr. 5-15 |

2. Pills containing special Iron-salts	{	a. <i>Pilula Ferri Carbonatis</i>	gr. 5-10
		b. „ <i>Ferri Iodidi</i>	gr. 5-15
3. Pills containing Mercury.	{	a. <i>Pilula Hydrargyri</i>	gr. 2-15
		b. „ „ <i>Subchloridi Composita</i>	gr. 5-10
4. Pills containing Opium, either alone or with other ingredients.	{	a. <i>Pilula Ipecacuanhæ cum Scillæ</i> (made with Dover's Powder)	gr. 5-10
		b. <i>Pilula Plumbi cum Opio</i>	gr. 4-6
		c. „ <i>Saponis Composita</i>	gr. 2-10
		(Opium is the only active ingredient = about gr. 1 in 6).	
5. Pills of various compositions.	{	a. <i>Pilula Assafoetidæ Composita</i>	gr. 5-20
		b. „ <i>Conii Composita</i>	gr. 5-10
		c. „ <i>Phosphori</i> , gr. $\frac{1}{8}$ in gr. 5	gr. 3-6
		d. „ <i>Quiniæ</i> , gr. 3 in 4	gr. 2-10
		e. „ <i>Scillæ Composita</i>	gr. 5-15

XXIII. PULVERES—POWDERS.

These preparations must be studied individually, but for mere reference they may be grouped thus:—

1. Inactive powders, chiefly used for pharmaceutical purposes.	{	a. <i>Pulvis Amygdalæ Compositus</i>	Dose. <i>ad lib.</i>
		b. <i>Pulvis Cinnamomi Compositus</i>	gr. 5-30
		c. <i>Pulvis Tragacanthæ Compositus</i>	gr. 20-60

2. Powder containing Antimony.	{	a. Pulvis Antimonialis, (contains Oxide of Antimony, 1 in 3)	. gr. 2-10
3. Astringent powders.	{	a. Pulvis Catechu Compositus . . .	gr. 20-60 or more.
	{	b. Pulvis Cretæ Aromaticus . . .	gr. 5 upwards.
4. Powders containing Opium.	{	a. Pulvis Cretæ Aromaticus cum Opio, 1 in 40	gr. 5-40
	{	b. Pulvis Kino Compositus, 1 in 20 . . .	gr. 5-30
	{	c. Pulvis Ipecacuanhæ Compositus, 1 in 10	gr. 2-10
	{	d. Pulvis Opii Compositus, 1 in 10 . . .	gr. 2-10
5. Purgative or aperient powders.	{	a. Pulvis Elaterii Compositus, 1 in 10 . . .	gr. $\frac{1}{2}$ -5
	{	b. Pulvis Glycyrrhizæ Compositus, (contains Senna) . . .	gr. 30-60
	{	c. Pulvis Jalapæ Compositus, (contains Cream of Tartar) . . .	gr. 15-40
	{	d. Pulvis Rhei Compositus	gr. 5-60
	{	e. „ Scammonii Compositus . . .	gr. 10-20

XXIV. SPIRITUS—SPIRITS.

1. Alcoholic group.	{	a. Spiritus Rectificatus.	
	{	b. „ Tenuior.	
	{	c. „ Vini Gallici.	
2. Ether and chloroform group.	{	a. Spiritus Ætheris . . .	3 $\frac{1}{2}$ -3
	{	b. „ „ Nitrosi . . .	3 $\frac{1}{2}$ -3
	{	c. „ Chloroformi . . .	℥ 10-3 i

3. Ammonia group.	{	<i>a.</i> Spiritus Ammoniaë Aromaticus . . .	℥20-3 ℥
		<i>b.</i> Spiritus Ammoniaë Fœtidus . . .	3 ½-1
4. Solutions of volatile oils in rectified spirit, = 1 in 49.	{	<i>a.</i> Spiritus Cajuputi . .	3 ½-1
		<i>b.</i> „ Juniperi . .	℥20-3 ℥
		<i>c.</i> „ Lavandulæ . .	℥20-30
		<i>d.</i> „ Menthæ Piperitæ .	℥10-30
		<i>e.</i> „ Myristicæ . .	3 ½-1
		<i>f.</i> „ Rosmarini . .	3 ½-2
5. Special.	{	<i>a.</i> Spiritus Armoraciæ Compositus . .	3 ½-2
		<i>b.</i> Spiritus Camphoræ . .	℥10-30

XXV. SUCCI—JUICES.

1. Fresh expressed juices of ripe fruits.	{	<i>a.</i> Succus Limonis . .	3 2-3 ℥
		<i>b.</i> „ Mori . .	<i>ad lib.</i>
		<i>c.</i> „ Rhamni . .	3 ℥-3
2. Expressed juices preserved with rectified spirit.	{	<i>a.</i> Succus Belladonnæ . .	℥5-15
		<i>b.</i> „ Conii . .	℥20-3 ℥
		<i>c.</i> „ Hyoscyami . .	℥30-3 ℥
		<i>d.</i> „ Scoparii . .	3 ℥-2
		<i>e.</i> „ Taraxaci . .	℥10-3 2

XXVI. SUPPOSITORIA—SUPPOSITORIES.

1. Suppositoria Acidi Carbolici cum Sapone, gr. 1.	
2. „ „ Tannici	
3. „ „ „ cum Sapone	} gr. 3.
4. „ „ Hydrargyri, gr. 5 of Unguentum Hydrargyri	
5. Suppositoria Morphiaë	} gr. ½ of Hydrochlorate.
6. „ „ cum Sapone	
7. „ Plumbi Composita	{ Acetate of Lead, gr. 3. Opium, gr. 1.

XXVII. SYRUP—SYRUPS.

1. Syrupus—Solution of sugar . . . *ad lib.*
2. Mixtures with or solutions in syrup. {
 a. Syrupus Chloral, gr. 10 in 3 i . . . m30-32
 b. Syrupus Aurantii, 1 of Tincture in 8 . . . 3 i-2
 c. Syrupus Zingiberis, 1 of Strong Tincture in 26 . . . 3 i-2
3. Syrups made from juices of fruits. {
 a. Syrupus Limonis, (with lemon-peel), 1 in 2 . . . 3 i-2
 b. Syrupus Mori, 1 in 2 . . . *ad lib.*
 c. „ Rhamni, (with Ginger and Pimento) . . . 3 i-2
4. Syrups made from parts of plants {
 a. Syrupus Hemidesmi . . . 3 i-3
 b. „ Papaveris . . . 3 ½-4
 c. „ Rhœados . . . 3 ½-1
 d. „ Rosæ Gallicæ . . . 3 i-2
 e. „ Rhei . . . 3 i-4
 f. „ Sennæ . . . 3 i-2
5. Syrups made from special preparations. {
 a. Syrupus Aurantii Floris (from Orange-flower Water) . . . 3 i-2
 b. Syrupus Scillæ (from Acetum Scillæ) . . . 3 ½-2
 c. Syrupus Tolutanus (from Balsam of tolu) . . . 3 i-2
6. Syrups containing Iron-salts. {
 a. Syrupus Ferri Iodidi, gr. 4½ in 3 i . . . m5-20
 b. Syrupus Ferri Phosphatis, gr. 1 in 3 i . . . m20-31

XXVIII. TINCTURÆ—TINCTURES.

It is very difficult to give any satisfactory classification of the 68 Official Tinctures, but the following may afford some aid in remembering them.

A. TINCTURES OF INORGANIC DRUGS.

Made with Rectified Spirit.

	Dose.
Tinctura Ferri Acetatis	m5-30
" " Perchloridi (1 of Liquor Fortior in 4)	m5-40
Tinctura Iodi, 1 in 40, (contains Iodide of Potassium)	m5-30

B. SIMPLE ALCOHOLIC TINCTURES OF VEGETABLE DRUGS.

(a). Made with Rectified Spirit.

1 in 2, Tinctura Zingiberis Fortior	m5-20
1 in 5 { Tinctura Pyrethri	m5-20
" Veratri Viridis	m5-20
1 in 8 { Tinctura Aconiti	m5-10
" Assafoetidæ	3 1/2-2
" Cubebæ	3 1/2-1
" Myrrhæ	3 1/2-2
" Tolutanæ	m20-32
1 in 10 { Tinctura Kino	3 1/2-2
" Nucis Vomicae	m5-10
1 in 20 { Tinctura Arnicae	m10-31
" Cannabis Indicae	m5-20
1 in 27, Tinctura Capsici	m5-15

(b). Made with Proof Spirit.

1 in 3.	Tinctura Aurantii Recentis	.	.	3 1-2
1 in 2.	Tinctura Ergotæ	.	.	3 $\frac{1}{2}$ -1
1 in 5.	Tinctura Cinchonæ Flavæ	.	.	3 $\frac{1}{2}$ -2
	Tinctura Buchu	.	.	3 $\frac{1}{2}$ -2
	„ Calumbæ	.	.	3 $\frac{1}{2}$ -2
	„ Cascarillæ.	.	.	3 $\frac{1}{2}$ -2
	„ Catechu, (contains Cinnamon)	.	.	3 1-2
	„ Chirataë	.	.	3 $\frac{1}{2}$ -2
	„ Cinnamomi	.	.	3 $\frac{1}{2}$ -3
	„ Colchici Seminum	.	.	3 $\frac{1}{2}$ -2
	„ Conii	.	.	m20-3 2
	„ Digitalis	.	.	m10-3 1
	„ Gallæ	.	.	3 $\frac{1}{2}$ -1
	„ Hyoscyami	.	.	3 $\frac{1}{2}$ -1
1 in 8	„ Jalapæ	.	.	3 $\frac{1}{2}$ -2
	„ Krameriaë	.	.	3 1-2
	„ Laricis	.	.	m20-30
	„ Limonis	.	.	3 $\frac{1}{2}$ -2
	„ Lobeliaë	.	.	m10-3 1
	„ Lupuli	.	.	3 1-3
	„ Sabinæ	.	.	3 $\frac{1}{2}$ -2
	„ Scillæ	.	.	m10-30
	„ Senegæ	.	.	3 $\frac{1}{2}$ -2
	„ Serpentariaë	.	.	3 1-2
	„ Stramonii	.	.	m10-20
	„ Sumbul	.	.	m10-30
	„ Valerianaë	.	.	3 $\frac{1}{2}$ -2
	„ Zingiberis	.	.	3 $\frac{1}{2}$ -1
1 in 10.	Tinctura Aurantii	.	.	3 $\frac{1}{2}$ -2
1 in 13 $\frac{1}{2}$.	Tinctura Opii	.	.	m10-40
1 in 20	Tinctura Belladonnæ	.	.	m10-30
	„ Croci	.	.	3 1-2

1 in 27, Tinctura Quassiae	3 $\frac{1}{2}$ -2
1 in 40 { Tinctura Aloes, (contains Extract of Liquorice)	3 1-4

C. AMMONIATED TINCTURES.

Aromatic Spirit { Tinctura Guaiaci Ammoniata 3 $\frac{1}{2}$ -1 of Ammonia. { „ Valerianæ „ 3 $\frac{1}{2}$ -2	
Strong Solution of { Tinctura Opii Ammo- Ammonia and { niata, 1 in 96 (a Com- Rectified Spirit. { pound Tincture) . 3 $\frac{1}{2}$ -1	
Solution of Ammo- { Tinctura Quiniæ nia and Proof { Ammoniata, gr. 1 Spirit. { in 3 1 . . . 3 1 or more	

D. TINCTURES MADE WITH SPECIAL MENSTRUUA.

Tinctura Lobeliæ Ætherea, made with Spirit of Ether	℥ 10-3 1
Tinctura Quiniæ, made with Orange Wine, gr. 1 in 3 1	3 1 or more

E. COMPOUND TINCTURES.

(a). Made with Rectified Spirit.

	Dose.
Tinctura Benzoini Composita	3 1-2
„ Chloroformi Composita	℥ 10-40
„ Lavandulæ Composita	3 $\frac{1}{2}$ -2

(b). Made with Proof Spirit.

Tinctura Camphoræ Composita, (con- tains Opium gr. 1 in 3 $\frac{1}{2}$)	3 $\frac{1}{2}$ -3
„ Cardamomi Composita	3 $\frac{1}{2}$ -2
„ Cinchonæ Composita	3 1-3
„ Gentianæ Composita	3 $\frac{1}{2}$ -2
„ Rhei	3 $\frac{1}{2}$ -4
„ Sennæ	3 1-4

F. TINCTURES OF ANIMAL DRUGS.

Proof Spirit.	{ Tinctura Cantharidis,		
	1 in 80	.	m 10-40
	„ Cocci, 1 in 8	.	ad lib.
Rectified Spirit,	„ Castorei, 1 in 20.		3 1-4

XXIX. TROCHISCI—LOZENGES.

Trochisci Acidi Tannici,	gr. $\frac{1}{2}$.
„ Bismuthi,	gr. 2.
„ Catechu,	gr. 1.
„ Ferri Redacti,	gr. 1.
„ Ipecacuanhæ,	gr. $\frac{1}{2}$.
„ Morphicæ,	gr. $\frac{1}{36}$ of Hydrochlorate.
„ Morphicæ et Ipecacuanhæ,	gr. $\frac{1}{36}$ and $\frac{1}{12}$.
„ Opii,	gr. $\frac{1}{10}$ of Extract.
„ Potassæ Chloratis,	gr. 5.
„ Soda Bicarbonatis,	gr. 5.

XXX. UNGUENTA—OINTMENTS.

For practical purposes the officinal ointments may be grouped thus:—

A. *Unguentum Simplex*, a mixture of prepared lard, white wax, and almond oil.

B. *Those containing Inorganic Drugs.*

1. Containing Iodine or Iodides.	{	a.	Unguentum Iodi, (contains Iodide of Potassium).
		b.	„ Sulphuris Iodidi.
		c.	„ Cadmii Iodidi.
		d.	„ Plumbi Iodidi.
		e.	„ Potassii Iodidi.

2. Unguentum Antimonii Tartarati.

- | | | | |
|---|---|----|-----------------------|
| 3. Containing Mercury or its compounds. | { | a. | Unguentum Hydrargyri. |
| | | b. | " " Compositum. |
| | | c. | " " Oxidi Rubri. |
| | | d. | " " Nitratis. |
| | | e. | " " Iodidi Rubri. |
| | | f. | " " Subchloridi. |
| | | g. | " " Ammoniati. |

- | | | | |
|----------------------------------|---|----|---|
| 4. Containing compounds of Lead. | { | a. | Unguentum Plumbi Acetatis. |
| | | b. | " " Subacetatis. |
| | | c. | " " Carbonatis. |
| | | d. | " " Iodidi, (also mentioned under Iodides). |

5. Unguentum Zinci, contains Oxide of Zinc.

- | | | | |
|--------------------------------------|---|----|-------------------------|
| 6. Containing Sulphur or a Sulphide. | { | a. | Unguentum Sulphuris. |
| | | b. | " " Potassæ Sulphuratæ. |

C. *Those containing Organic Drugs.*

- | | | | |
|---|---|----|--|
| 1. Containing parts of plants, or vegetable products or preparations. | { | a. | Unguentum Belladonnæ, (Extract 1 in 6½). |
| | | b. | Unguentum Elemi. |
| | | c. | " " Gallæ. |
| | | d. | " " Gallæ cum Opio. |
| | | e. | " " Sabinæ. |

- | | | | |
|-----------------------------------|---|----|--------------------|
| 2. Containing powerful Alkaloids. | { | a. | Unguentum Aconitiæ |
| | | b. | " " Atropiæ |
| | | c. | " " Veratriæ |

gr. 8 in 3 i.

- | | | | |
|---|---|----|---------------------|
| 3. Containing products of distillation of wood. | { | a. | Unguentum Creasoti. |
| | | b. | " " Picis Liquidæ. |
| | | c. | " " Terebinthinæ. |

- | | | | |
|-----------------------------|---|----|------------------------|
| 4. Containing Animal drugs. | { | a. | Unguentum Cantharidis. |
| | | b. | " " Cetacei. |

XXXI. VAPORES—INHALATIONS.

1. Vapor Acidi Hydrocyanici, m_{10} to 15 to 3 i of *cold* water.
2. Vapor Chlori, made by moistening Chlorinated Lime with water.
3. Vapor Coniæ, made with Extract of Hemlock, Solution of Potash, and water.
4. Vapor Creasoti, m_{12} to $\frac{3}{8}$ of *boiling* water.
5. Vapor Iodi, consists of Tincture of Iodine, 3 i with water $\frac{3}{4}$ i , heated gently.

XXXII. VINA—WINES.

1. Simple Wines. $\left\{ \begin{array}{l} a. \text{ Vinum Aurantii.} \\ b. \quad \quad \text{,, Xericum.} \end{array} \right.$
2. Wines containing inorganic drugs. $\left\{ \begin{array}{l} a. \text{ Vinum Antimoniale,} \\ \quad \quad \quad (\text{gr. 2 in } \frac{3}{4} \text{ i}) \quad . \quad . \quad \text{m}_{10-32} \\ b. \text{ Vinum Ferri} \quad . \quad . \quad 3 \text{ i}-\frac{3}{4} \text{ i} \\ c. \quad \quad \quad \text{,, Citratis, (made} \\ \quad \quad \quad \text{with Orange Wine) gr. 8 in } \frac{3}{4} \text{ i } \frac{3}{4} \text{ i}-1 \end{array} \right.$ Dose.
3. Wines containing vegetable drugs. $\left\{ \begin{array}{l} a. \text{ Vinum Aloes} \quad . \quad . \quad 3 \text{ i}-3 \\ b. \quad \quad \text{,, Colchici} \quad . \quad . \quad 3 \frac{1}{2}-2 \\ c. \quad \quad \text{,, Ipecacuanhæ} \quad . \quad \text{m}_{5-32} \\ d. \quad \quad \text{,, Opii, (1 of Extract} \\ \quad \quad \quad \text{in 20)} \quad . \quad . \quad \text{m}_{10-40} \\ e. \text{ Vinum Quiniæ, (made with} \\ \quad \quad \quad \text{Orange Wine), gr. 1 in } \frac{3}{4} \text{ i} \quad \frac{3}{4} \text{ i} \\ f. \text{ Vinum Rhei} \quad . \quad 3 \text{ i}-4 \text{ or more.} \end{array} \right.$



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